# Contents

# Welcome

## *Welcome from Industry Stakeholders - Volac.*

**Una Hickey**

On behalf of all the industry stakeholders I would like to welcome you to both of the DairyBeef 500 Programme demonstration summer farm walks. 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.

# 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.

## Drummonds

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.

## Liffey Mills

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 two summer walks as part of our 2023 DairyBeef500 farm walk series. I would like to express our gratitude to both Ciaran Bartley in Limerick, and Jarlath and Austin Ruane in Mayo and their respective families 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.

Ciaran and the Ruane's have 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. They have demonstrated their open mindedness and ambition to improve profitability of their farms through implementation of technologies to reduce inputs and age of slaughter while maintaining carcass output on the farm.

Both farm families have 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 – Ciaran Bartley

On behalf of the Bartley family, I would like to welcome you all here to Co. Limerick 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 liveweight gain from forage and herd health, and I hope that you will take home something from the event to help make your farming business more streamlined and profitable. I would like to give a special mention of thanks to my family who are of huge help to the running of the farm and help out regularly, especially during calf rearing and silage making.

## Farmer welcome – Jarlath Ruane

On behalf of myself my father Austin and the Ruane family I would like to welcome everyone here today to Co. Mayo to our farm. We hope you have an enjoyable visit and that you find the day both informative and worthwhile. Since joining the Teagasc Green Acres Dairy Calf to Beef Programme and then followed on to the DairyBeef 500 the farm has undergone many changes. These changes were all simple steps but are all having a positive impact in the performance of the farm. The completion of the farm plan opened my eyes to the potential of the farm and the scope it had for improvement, it also gave me a huge focus on the key areas I needed to improve in order to achieve its potential.

The key areas I focused on improving were grassland management, herd health and my calf sourcing policy and these along with other small change and how they positively impacted my farm will be discussed here today.

Finally, we would like to thank both Teagasc and the industry stakeholders for their continued support of the programme.

# DairyBeef 500 Campaign Introduction

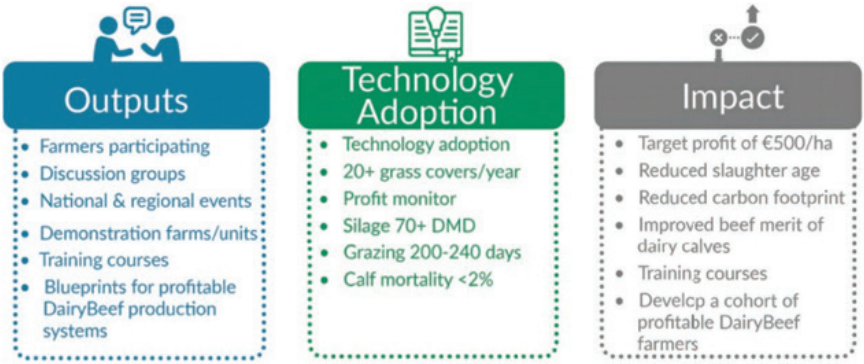
Teagasc has developed a new initiative which focuses on management practices for technically-efficient, dairy-beef systems called DairyBeef 500. The campaign will promote the adoption of technologies identified through research onto commercial farms, while monitoring their impact on farm sustainability.

*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 – Ciaran Bartley

Ciaran runs a farm of 74 hectares, the majority of which is in one block and of mixed quality. Approximately 30% of the farm is of a limestone nature and free draining while the remainder of the land is lower lying and which may not be dry enough to graze at the shoulders of the year.

The farm runs 160 calves through to finish as steers at 19-24 months of age. The majority of calves are Friesian bulls with a smaller number of early maturing bulls and heifers purchased also. The calves are sourced locally from 4-5 farmers within a 20 miles radius with Ciaran having established a relationship with a number of dairy farmers whom he returns to each year.

Ciaran recently purchased 41 hectares of land that he had been renting for a long number of years and this land will require significant investment in drainage and reseeding along with building a new slatted shed. This will be carried out over a number of years as cashflow and finances allow. Investments such as this can have a big impact on the level of free cash in a farming business due to interest and capital repayments on farm loans hitting at different times of the year. Therefore a robust farm financial plan is needed to ensure no cash shortages occur at critical times.

Ciaran runs a one man operation on his farm with help from his children at weekends and evenings. He carries out the majority of machinery work on the farm to keep down contractor costs.

A large focus on the farm has been on a low age of slaughter. Ciaran kills the majority of his cattle at 21-24 months. This has been achieved by focusing on weight for age and weighing his stock regularly. Calves have to thrive at every stage of life with no store period to achieve a lower age of slaughter. This has shown itself to be of benefit to both increase farm profitability and reduce emissions on farm.

While Ciaran has been focusing on purchasing good quality early Friesian bull calves over the past few years, he has purchased some Hereford and Angus in 2023. With the likelihood of these calves becoming available earlier in the year in future Ciaran may look at this option to further reduce age of slaughter and reduce the level of meal input in the finishing stage.

Ciarans farm financial performance has been steady over the past number of years. The farm has taken on considerable debt and investments in the past few years with the purchase of 41 hectares of land that was leased in

for a number of years. The interest repayments and capital investment in the land will lead to higher fixed costs until the farm is fully set up.

The main focus of investment will be in drainage and reseeding along with a new slatted shed which will be built under grant aid from TAMS3.

The farm has been limited from increasing output any further for the moment due to a lack of extra winter accommodation and slurry storage. This will be rectified in the next 2 years once a new shed is erected.

Output levels on the farm are relatively strong with close to 600kg liveweight per livestock unit. The farm has the capability to carry a higher level of stock due to its capability to grow high quantities of grass. The farm will move from 1.9 to 2.2 LU per hectare in the next 2 years while maintaining the same level of output per livestock unit to produce in excess of 1300kg LW/ha from a predominantly forage based diet.

The biggest costs on the farm for 2022 are meal and fertilizer. Having the majority of cattle killed at 21-24 months of age means a significant indoor feeding period. In 2022 meal prices increased by over 30% while fertilizer nearly trebled in price. This left the final indoor finishing period extremely expensive with meal costing nearly €450/tonne and silage, €40-45/bale to make. The finishing cost of steers therefore came to greater than €400/head.

With the level of output on the farm limited by housing availability and slurry storage currently and fixed costs likely to remain high on the farm it is likely Ciaran will max out his profitability at around €500/ha. Some farmers in the programme that have larger availability of sheds and have the grassland infrastructure and sward quality rectified have the capability to achieve close to €1000/ha net profit.

## Farm Financials – Ciaran Bartley

| Year | Hectares | Stocking rate Lu/ha | Gross output kg/ha | Gross output kg/lu | Gross output €/ha | Var Cost €/ha | Fixed Cost €/ha | Net Profit €/ha |
|---|---|---|---|---|---|---|---|---|
| 2022 | 73.9 | 1.9 | 1124 | 592 | 2434 | 1385 | 768 | 281 |
| 2021 | 73.9 | 1.97 | 1126 | 571 | 2176 | 1147 | 672 | 357 |
| 2020 | 73.9 | 1.84 | 1033 | 562 | 1751 | 900 | 502 | 349 |
| 2019 | 73.9 | 1.85 | 992 | 532 | 1617 | 827 | 527 | 262 |

# Land drainage

The function of a main drainage system is to collect, transport and dispose of water collected from the field drainage system through an outlet

A groundwater drainage system is a network of field drains collecting groundwater which can move through soil layers of high permeability. They work by exploiting the natural capacity for movement of water at a certain depth in certain soils. Often heavy textured soils overlie soils of much higher permeability (poorer subsoils closer to the surface and more permeable layers underneath).

Ciaran's farm was assessed by Teagasc in early summer 2022 to ascertain what type of drainage system was required on the farm. Much of the farm consists of slightly low lying land with a high clay content that causes slow

levels of soakage from the top layers to the lower layers. The first field assessed was a 12 acre field near the yard which consisted of a number of humps and hollows with the lower hollows holding water during periods of heavy rainfall. There was a number of areas of the fields where underground springs were causing areas of the field to swamp for much of the year. Following an assessment from the Teagasc drainage team , the advice given was to incorporate a team of shallow drains trough the hollows to the main outlets. The main outlet for the drains was quite shallow and didn't allow for a deep drainage system. Mole ploughing will be carried out between the drains to further aid drainage.

The drainage works were carried out in July 2022 with the costings outlined below. The main questions a farmer needs to ask himself once they tackle a drainage job is what is the budget to complete the job and will they get a satisfactory return on their investment.

**Table 1.** Drainage cost Ciaran Bartley 12 acres

| Item | Total cost € | Cost per acre € |
|---|---|---|
| Digger work | 3000 | 250 |
| Piping | 500 | 42 |
| Stone | 3200 | 267 |
| **Total** | **6700** | **558** |

# Mid-season grassland management

Many stages in dairy calf to beef production systems can be high cost, therefore the more efficient farmers are at maximising high quality grazed grass in the diet will lead to higher performance and profitability.

The main aims of grass management are to achieve a long grazing season, produce high quality grass and maximise utilisation.

Below are some of the key factors in achieving these goals.

## 1. Farm infrastructure

### *a) Paddocks*

There should be six to seven paddocks per grazing group. The paddock sizes should allow two to four days in each paddock.

A simple rule of thumb for determining paddock size is that every 1000kgs animal live weight requires 0.05Ha, therefore 50 animals weighing 320kgs = 16,000kgs, requires 16 x 0.05 Ha = 0.8ha paddocks.

Every farm should have a farm map to identify each individual paddock.

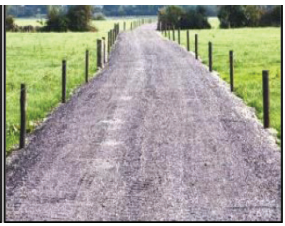
### *b) Farm roadway*

Accessibility is key to facilitating a long grazing season. Getting animals out to graze earlier in the season requires a well-designed farm roadway with multiple access and exit points. A good roadway also allows farmers to be to be able to regularly move stock on their own.

### *c) Water*

A good water system is essential on any farm. Adequately sized troughs to meet the needs of the group size should be available in each paddock. Troughs should be strategically placed so that paddocks may be sub divided to maximise grass utilisation.





## 2. Regular grass measurement and budgeting

In mid-season grass growth on farm can change rapidly, therefore it is important to walk the farm regularly (at least once per week) and complete a grass measurement and budget. Measurements can be recorded on 'Pasturebase' to aid grass management decisions where surpluses or deficits are identified.

## 3. Pre grazing covers

The optimum grazing covers in June/July is 1300 – 1500 kgs DM/Ha, or 8 – 10cm in height. Grazing these covers allows animals to avail of high quality leafy grass to maximise performance. Higher covers lead to poor utilisation and performance. Less grass is produced by grazing lower covers.

## 4. Rotation length

Ideally grass is grown in three weeks and grazed in three days, giving a 21 day rotation. Depending on conditions, this may be reduced to 18/19 days in mid season.

## 5. Post grazing height

Grass allocation should be matched to stocking rate so that animals have a paddock/field grazed out within three days. The paddock should be grazed down to 4 – 4.5cm (100kgs DM/Ha). Obtaining a tight grazing, allows quality grass to regrow from the base with minimal poorer quality material.

## 6. Surplus grass

Where surplus grass can be identified on the farm, these paddocks should be skipped for grazing and high quality silage bales should be removed. Ideally surplus bales should be taken from different paddocks and not continuously from the one paddock.

# Silage quality ten point plan

On dairy calf to beef farms, all animals are priority stock and each day that an animal is on farm it is essential that they are gaining weight. As silage can make up to at least a quarter of the annual diet on these farms, during the wintering housing period the animals should be fed a very high quality silage to achieve a minimum average daily gain (ADG) of 0.6kgs per day.

From the table below, the difference in the amount of concentrates required to supplement a 62% Dry Matter Digestibility (DMD) silage versus a 72% DMD silage to achieve the targeted ADG of 0.6kgs/day incurs a very significant cost over a full winter period.

| **Silage Quality** | **Good 72%+ DMD** | **Average 67-68% DMD** | **Poor 62% DMD** |
|---|---|---|---|
| ***Concentrate levels (kg/head/day) based on silage quality (DMD) to achieve ADG of 0.6kgs/day*** | | | |
| **Kgs/Head/Day** | **1** | **2** | **3** |
| ***Total concentrate required***<br>100 weanlings<br>120 day winter | **12 Ton** | 24 Ton extra required<br>***c.*€9,600**<br>based on concentrate price of €400/ton | **36 Ton** |

## 1. Spring grassland management

A tight grazing of the silage ground in early to mid-March, allows any dead material to be removed from the sward and the silage crop can then start growing high quality leafy material from the base.

## 2. Closing date

Having the silage area grazed in time, applying slurry and chemical fertiliser before the end of March allows up to 50 days (7 weeks) of growth before harvesting the crop between the 16th and 20th May.

### 3. Soil test

Up to date soil analysis are essential to give an indication as to where the soil fertility is in relation to phosphorus (P) and potassium (K) levels. The slurry and chemical fertiliser can then be applied at appropriate rates to take account of the soil status and the demands of the crop to be grown.

### 4. Application of slurry and chemical fertilisers

Slurry is a very variable product and in order to accurately determine the value of the slurry on the farm, it should be tested to determine dry matter and N, P, K values. Following slurry application, chemical fertiliser can then be applied to match N, P and K requirements. A nine/ten tonne per acre (fresh weight) crop of silage will require 125kg N/Ha (100units/acre), 20kg P/Ha (16 units/acre) and 125kg K/Ha (100 units/acre).

### 5. Sulphur

Sulphur is required to improve grass dry matter yields and quality of the silage crop. Sulphur also allows Nitrogen to be used more efficiently. Every silage crop has a requirement of 20kgs S/Ha (16 units/acre) per cut.

### 6. Weed control

Weed infestation and in particular docks will devastate both quality and yield of the silage crop. The most effective management to long term control is to spray two to four weeks after fertiliser application and a minimum of three weeks before silage is harvested.

### 7. Cutting the silage crop at the right stage

Grass growth stage at harvest is the most important factor deciding silage quality. Once seed heads appear DMD will be below 70% and will drop by 1 point every 2-3 days after that.

### 8. Do not sacrifice bulk for quality

Well managed silage swards closed from late March should have good yields of 5.5 - 6t DM per Ha (9-10 tonnes per acre fresh) ready for cutting by mid-May. Using a 'one big first cut' approach by pushing the cutting date into June, not only decreases the quality of the silage but also reduces the annual grass production of the field.

### 9. Don't wait for all Nitrogen to leave the crop

A common reason for putting off cutting silage is concern about Nitrogen. A useful guide is that grass uses 2.5 kg N (2.0 units) per day on average, so the final N application should be applied 50 days before the planned cutting date. If weather conditions are suitable for cutting earlier, test the grass crop for sugars rather than sticking rigidly to the '2-unit rule'. If sugars are over 3% then the crop will ensile readily, at 2-3% wilting will be beneficial, while below 2% an additive will be required. Mow in the evening when sugars are highest if possible.

### 10. Wilt for 24 hours where weather permits

Wilting grass to 28-30% dry matter is very beneficial for good preservation, especially if sugars are less than 3.5% and nitrate is somewhat elevated. Tedding out for 24 hours is the recommended approach.

# 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 seven beef traits are :

- Carcass weight
- Slaughter age
- Carcass conformation
- Carcass fat
- Docility
- Conformation Spec
- Fat Spec
- Carcass weight spec and Feed intake.

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 will need to drill down into the DBI figures and focus on the Beef Sub Index to produce a calf that has a high CBV. Many 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.

- The tables below show the minimum beef sub index that you should be looking for in a bull in order to breed 4-5 star CBV calves from the different cow types that are common in Ireland.

**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 Difference |
|---|---|---|
| 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 Difference |
|---|---|---|
| 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 Difference |
|---|---|---|
| 4 star CBV calf (Top 40% of BXD calves) | €63 | 102 |
| 5 star CBV calf (Top 20% of BXD calves) | €106 | 31 |

# Farm overview – Jarlath & Austin Ruane

Jarlath and Austin Ruane operate a dairy calf to beef and lowland sheep system in Corbally just outside Claremorris, Co. Mayo. The farm compromises of 34Ha which can be described as being predominately clay type soil. The farm which would be typical of the area is fragmented divided in four main blocks within a 5-mile radius of where we are here today.

Traditionally the farm had store to beef and lowland sheep enterprises. Austin first dipped his toes into calf to beef in 2016 with the purchase of 10 dairy bred calves. Since then the numbers have increased steadily with approximately 80 calves been reared through to beef annually on the farm. Initially during the set up phase there was a number of teething problems with calf genetics, calf quality and the number of sources from which calves were purchased creating issues on the farm but over the past few years these hurdles have been overcome and the system developed.

The bought in calves on the farm are a mixture of Holstein Friesian, Angus, Hereford and Limousin and are finished at various different ages. The heaviest of them are killed at 20-21 months of age following the second grazing season with the rest going on to be slaughtered at 24 months of age out of the shed with the remainder going back out to grass for the third grazing season and been slaughtered at approximately 28 months. The split in the slaughter dates is excellent from a cash flow point of view and maximises use of housing but going forward the plan is to reduce the numbers going back to grass for the third season and increase overall numbers.

With both Jarlath and Austin working full time off farm the decision was made in 2020 to install an automatic calf feeder to reduce labour.

There is excellent grazing infrastructure on the farm with the majority of it been serviced by an extensive network of paddocks, water and roadways. This infrastructure is key maintaining grass quality in front of stock at all time is of the highest quality which ensures high levels of animal performance. At the commencement of the Teagasc Green Acres Programme, 50% of Ruanes's farm was at the optimum level for pH index 3 for P and K. Through an intensive liming and fertility programme, which is still ongoing today, this is slowly improving. 70% of the farmed area is now at a pH of 6.3 or great and 58% either index 3 or 4 for P and 68% at index 3 or 4 for K.

# Farm Financials – Jarlath & Austin Ruane

In recent years the improvements in technical efficiency has reaped continued reward with farm profitability steadily increasing. Heavier carcasses and increased numbers have seen beef output on the farm increase by over 500kg/ha from the 1204kg/ha recorded in 2018 to the output of 1704kg/ha recorded last year, with most of this extra gain coming from grazed grass or high quality silage. The extra beef going out the farm gate and increase in beef price has seen gross output in monetary terms increase significantly in recent years and going forward the plan is the try and keep this output at similar levels and try reduce variable costs where possible. Meal, fertiliser and calf rearing costs account for the highest proportion of variable costs with meal contributing to 41% of total variable costs with fertiliser and calf rearing costs contributing to 23% and 14% of variable costs respectively. Continued efforts are been made to reduce theses costs by increased weight gain from grass. In the future fixed costs are expected to rise with plans in place to construct new slatted accommodation under TAMS.

| Measure | 2020 | 2021 | 2022 | 2023 (Projected) |
|---|---|---|---|---|
| **Physical** | | | | |
| Land base (adj. ha) | 21 | 21.2 | 28.5 | 28.5 |
| Stocking rate (LU/ha) | 3.17 | 2.33 | 2.87 | 2.8 |
| Calves purchased | 65 | 74 | 79 | 80 |
| Liveweight output (kg/ha) | 1626 | 2057 | 1704 | 1800 |
| **Financial** | | | | |
| Gross output (€/ha) | 3,057 | 4,043 | 4,554 | 4,806 |
| Variable costs (€/ha) | 1,878 | 2,353 | 2,796 | 2,740 |
| Variable costs (% of gross output) | 61% | 58% | 61% | 57% |
| Gross margin (€/ha) | 1,179 | 1,689 | 1,758 | 2,066 |
| Fixed costs (€/ha) | 876 | 783 | 897 | 950 |
| Net margin (€/ha)(excluding subsidies) | 303 | 906 | 861 | 1,116 |

# Reducing the age of slaughter

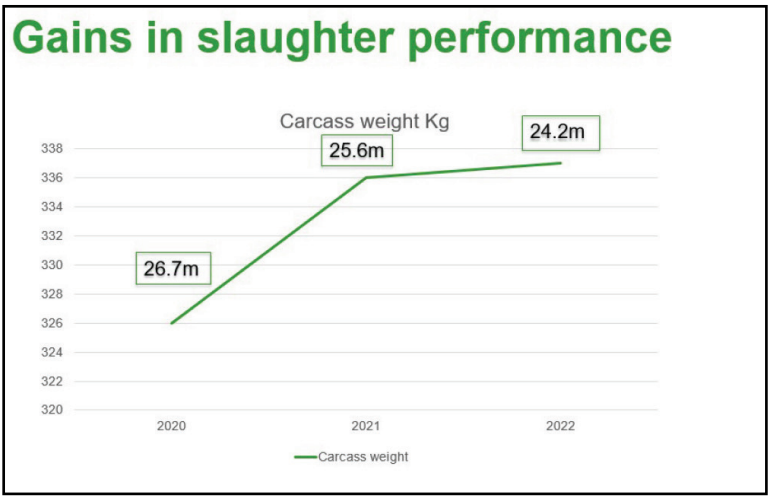
Irish agriculture is obliged to reduce greenhouse gas (GHG) emissions by 25% by 2030, as set out in the Climate Action Plan. One of the many strategies being targeted to achieve this target is the reduction in the age of slaughter of animals on beef farms by three months, moving from an average of 27 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 Ruane's have been working on since joining the Teagasc Green Acres Dairy Calf to Beef 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 also the quantities of methane being produced have been reduced.

## Slaughter performance

At the commencement of the Teagasc Green Acres Programme when a farm plan was been devised to improve efficiency one area on the farm that warranted consideration was the animal performance, specifically the weight for age been and carcass weights being achieved at slaughter. When slaughter data was analysed a particular trend was obvious that genetics with high jersey influence was contributing lighter poorer quality carcasses. When purchasing these calves at the time the price was conceived to be 'cheap' but when the figures were done the increased costs associated with keeping these animals to greater ages to meet factory specs and the reduced carcass weight been achieved profitability with those animals were less than what was been achieved with their comrades with superior genetics.

Along with lower levels of profitability been achieved from those animals they also left behind an increased environmental footprint due to the fact many of these animals were been kept into their third gazing system and this was something which the Ruane's were conscious they wanted to address. As can be seen from the graph greater attention to calf souring on farm is playing dividend with substantial increase in carcass weights at a

younger slaughter age. Going forward the plan is to reduce the age of slaughter further by reducing the number of cattle been turned back out for the 3d grazing season to under 10% of the total number of animals slaughtered on the farm.




## Slaughter performance 2022

| Animal Type | Number | Average Carcass Weight |
|---|---|---|
| Steers 19-21months | 15 | 320 kg |
| Steers 24 months | 37 | 339 kg |
| Steers under 30 months | 16 | 344 kg |
| Heifers 19 Months | 10 | 287kg |

# Animal Health – 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

| **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. |

things can impact on its onset and course. The highest risk 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

Tables below show different 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/Mannheimi ahaemolytica (Pasteurella) | Intramuscular |
| 9 months | IBR live | IBR | Intramuscular |
| 14 months | Clostridia | Clostridial diseases | Subcutaneous |
| 15 months | IBR live | IBR | Intramuscular |

# Mid-Season 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.

## Liver Fluke

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 | | | ✓ |

# Herd health protocols

## Ciaran Bartley protocol

### Sourcing

Calves are sourced from 4-5 farms within a 20 mile radius of Ciaran's farm. This means 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. Ciaran 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 on arrival

Calves are vaccinated for RSV and Pi3 intranasal and IBR blackleg at turnout. A follow up booster vaccination of blackleg and IBR are given at later stages.

### Dosing of calves

Dung sampling is carried out at regular intervals during the year and dosing for worms is carried out accordingly. Ciaran is conscious to alternate between drugs, using albendazoles, levicides and ivermectin based products throughout the year. This avoids chance of resistance building up.

## Jarlath Ruane protocol

### Sourcing

Reducing the number of calf sources has had a highly positive effect on the overall herd health and the farm and reduced the incidence of illness and treatment required in calves during the calf rearing phase. During the initial venture into calf rearing calves came from a number of different sources with the 50 calves purchased in 2019 having come form 26 different sources including dealers and marts. The wide variety of sources brought about its own issues with an outbreak of scour and pneumonia occurring. This incidence let to a change in mind-set in the calf souring policy for the farm and led the Ruane's down the road of purchasing directly of farms local. This spring 79 calves were purchased from 4 local farms with the furthest source been a 20 minute trip from the farm. The short trip ensures very little upset and calves and reduces the risk of a potential disease outbreak.

### Vaccination on arrival

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.

### Dosing of calves

Sheep are grazed behind calves early in the year and this reduced burdens. Regular faecal sampling is carried out during the year and when counts in excess of 200 eggs per gram are recorded a dose is administered. When choosing an anthelmintic Jarlath generally alternates between the different classes of drug to reduce the risk of resistance.

# 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 100 kg inorganic N/ha from the atmosphere

# Notes

# Notes