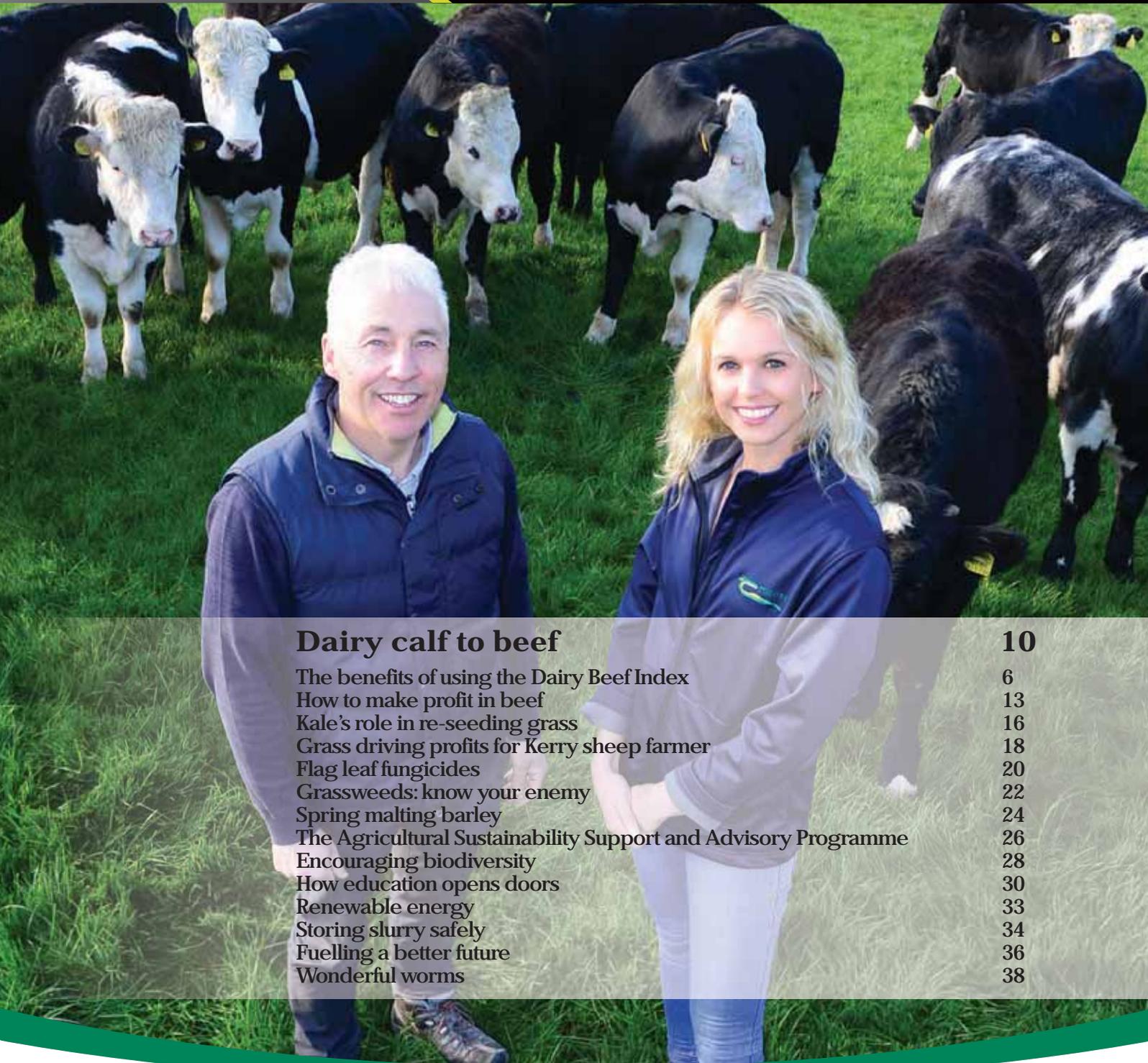




Today's Farm

Business, production, environment and countryside issues www.teagasc.ie



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COMMENT



Mark Moore
Editor,
Today's Farm

Expanding the pie

Bad negotiators think that if their counterpart gains, they must have lost. They believe in a 'zero-sum' game. Smart negotiators seek solutions which mean everyone not only gets a good deal, but more than they thought possible. The Dairy Beef Index is a bit like that. The dairy farmer doesn't end up with an unsaleable bull calf and the beef farmer has something he can make more from. There's a bigger pie to share.

An phióg a mhéadú

Measann an droch-idirbheartaí má bhaineann a chéile comhraic rud éigin amach go bhfuil rud éigin caillte aige. An dearcadh dubh agus bán. Téann an t-idirbheartaí cliste sa tóir ar réitigh a thugann na daoine ar fad margadh maith, b'fhéidir margadh i bhfad ní b'fhearr ná a cheapaíds a bheith indéanta. Tá cosúlacht éigin idir sin agus Innéacs na Mairteola Déiríochta. Ní fhágtar an feirmeoir déiríochta le laoi fireann nach féidir a dhíol, agus fágtar an feirmeoir mairteola le rud éigin fiúntach. Tá pióg níos mó ann le comhroinnt.



Making the most of your arable area
Spring malting barley has earned its place in the rotation for the Donnellys
>> 24-25

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Cover | John Burke who operates a dairy calf to beef unit near Baltinglass with Ruth Fennell who manages the dairy calf to beef unit at Teagasc Johnstown Castle.



Johnstown Castle, estate, museum and gardens opens in spring 2019

Established as the seat of the Esmondés in the 12th century, confiscated by Cromwell in the 1600s and eventually gifted to the Irish State in 1945, Johnstown Castle near Wexford has a long and fascinating history. It was a Department of Agriculture research station until 1960 when it was taken over by An Foras Talúntais and ultimately became part of Teagasc.

Teagasc remains the owner of the Johnstown Castle Estate and continues to operate a large research facility on site. Teagasc staff at Johnstown Castle focus, in particular, on environmental and soils research.

John Spink, head of the Teagasc Crops, Environment and Land Use Programme, said: "Teagasc will still have direct responsibility for most of the estate, which is divided into beef and dairy farms. Environmental impact is a key focus of our research.

"Managing tourism or heritage facilities is not our expertise, so we are delighted to be working with the Irish Heritage Trust and the Irish Agricultural Museum to make the facilities available to the public and generate some income to preserve them for

future generations."

The Irish Heritage Trust, an independent charity, was announced in 2015 as the successful applicant to work with Teagasc and the Irish Agricultural Museum to develop and operate a new and exciting visitor experience. The Irish Heritage Trust was created in 2006 to care for and conserve historic properties, houses and gardens throughout Ireland.

The spectacular lakes, walled gardens and sculptures all offer the beautiful setting for the great 19th century castle designed by the Victorian architect Daniel Robertson who is responsible for many projects in Ireland including Powerscourt in Co Wicklow.

Conservation

Initial conservation and upgrading works on the gothic revival castle have been undertaken and will be complete in May 2019, when the castle opens for the first time to the public, including the fascinating servants' tunnel at an incredible 86 metres long.

This three-in-one attraction includes guided tours of the gothic revival

castle with adjoining servants' tunnel – believed to be the longest in the country; the Irish Agricultural Museum; and the famous ornamental gardens. The museum's exhibitions display and explore the collection of folk, farming, rural history and objects from the turn of the 18th century until the middle of the 20th century.

Visitors can enjoy the walks around the charming castle lake with its gothic towers, waterfall and statues. The castle lake is the middle of three lakes and was the first to be constructed in the late 1830s as part of the grand vision for the estate. At almost five acres, it is home to numerous waterfowl. Around the fringes of this lake are two follies, including a fishing tower, as well as seven statues which were completed at the same time as the lake.

This multi-faceted destination will also feature a purpose-built visitor centre. Facilities will include a large restaurant and terrace, an extensive shop specialising in local products and a comprehensive introduction to all the activities on offer across the estate.

WEDNESDAY, 08 MAY 2019

Forest Walk Cavan

- Pre-thinning conifers & broadleaves
- Venue: Meeting Point: Spar Drumacoon Service Station, Drumacoon, Belturbet, H14 YX95
- Event Time: 7pm

Organic Demonstration Farm Walk Offaly

- Cereals, Sheep, Beef Finishing
- Venue: Ross & Amy Jackson, Woodview House, Lacka, Carrig, Birr, Co. Offaly
- Event Time: 12pm.

THURSDAY, 09 MAY 2019

Forestry Walk Clare

- Continuous Cover Forestry
- Venue: Meeting Point: Bodyke Church, Broadford, V94 YW93
- Event Time: 7pm

Forest Walk Kerry

- Early forest Management (Native Woodland establishment)
- Venue: Meeting Point: Heather Restaurant car park, Tomies west, Gap of Dunloe, Killarney, V93 WP94
- Event Time: 7pm

MONDAY, 13 MAY 2019

Spring Crop Walk Wicklow

- Venue: Sylvester Bourke, Killiniskyduff, Arklow, Co. Wicklow, Y14Y201
- Event Time: 2:00

TUESDAY, 14 MAY 2019

Spring Crop Walk Galway

- Venue: John Daly, Hillcrest, Kilconnell, Ballinasloe, Co Galway, H53C6F6
- Event Time: 19:00

THURSDAY, 16 MAY 2019

Open Day - Michael Ryan - Munster Grassland Farmer of the Year

- Venue: Cashel, Co. Tipperary
- Event Time:

•

WEDNESDAY, 22 MAY 2019

Organic Demonstration Farm Walk Louth

- Cereals, Milling Flour
- Venue: Andrew & Leonie Workman, Dunany Flour Organic, Togher, Drogheda, Co. Louth A92 T6CC
- Event Time: 2pm

WEDNESDAY, 29 MAY 2019

Organic Demonstration Farm Walk Laois

- Cereals, Beef Finishing
- Venue: Tom & Gemma Dunne, Seefeld Farm, Ballinaslee, Durrrow, Co. Laois R32 DR90

Dairy calf to beef open day

• Tuesday, 21 May 2019

- DairyBEEF2019, a Dairy Calf to Beef Open Day, will take place on Tuesday, 21 May at Teagasc, Johnstown Castle, Co. Wexford.
- Venue: Johnstown Castle Research Farm, Co. Wexford
- Event Time: 11am

WEDNESDAY, 05 JUNE 2019

Organic Demonstration Farm Walk - Limerick

- Dairy
- Venue: Sean Condon, Fanningstown, Crecora, Co. Limerick
- Event Time: 2pm

TUESDAY, 11 JUNE 2019

Talking Timber - timber marketing event

- Venue: Charleville Park Hotel, Charleville, Co Cork
- Event Time: -

Equine Young Breeder Training Day

- Venue: Army Equitation School, McKee Barracks, Cabra, Dublin 7
- Event Time: 1.30pm

WEDNESDAY, 12 JUNE 2019

Organic Demonstration Farm walk - Laois

- Sheep, Cereals
- Venue: Jason Stanley, Castlefleming, Errill, Co. Laois
- Event Time: 2pm

National Milk Quality Farm Walk (in association with NDC, Ornuia, Lakeland Dairies)

- Farm walk on the 2018 National Winners of the NDC & Kerrygold Quality Milk Awards
- Venue: Farm of Darren McKenna, Emyvale, Co. Monaghan
- Event Time: 1:30pm

THURSDAY, 13 JUNE 2019

Talking Timber – timber marketing event

- Venue: Abbeyleix Manor Hotel, Abbeyleix, Co Laois
- Event Time: -

TUESDAY, 18 JUNE 2019

Open Day - Tomas O'Leary - Sheep Grassland Farmer of the Year

- Venue: Killarney, Co. Kerry
- Event Time: -

WEDNESDAY, 19 JUNE 2019

Organic Demonstration Farm Walk Kildare

- Fieldscale Veg, Protected Crops, Poultry eggs, Direct Selling
- Venue: Nurney Farm Organics, Carbury, Co. Kildare W91 FK11
- Event Time: 2pm

WEDNESDAY, 26 JUNE 2019

Organic Demonstration Farm Walk - Donegal

- Fieldscale Veg, Protected Crops, Direct Selling
- Venue: White Oaks Acorn Project, Leanamore Rd, Derryvane, Muff, Co. Donegal
- Event Time: 2pm

Crops Open Day

Venue: Teagasc, Oak Park, Carlow

The 2019 Crops Open Day will be held Wednesday

June 26th at Oak Park

Carlow. With over 30

individual research

exhibits illustrating the

full range of on-going

research that Teagasc

is conducting with its

national and interna-

tional partners, the Open

Day provides an op-

portunity to gain valuable

updates on agronomy for the

full range of combinable crops,

headland management/biodiversity

for beneficial insects, crop improve-

ment, forestry (particularly continuous cover

forestry) crop nutrition and protection and fertiliser spreading.

The event will run from 11am-6pm.



Dairy breeding decisions

George Ramsbottom
Teagasc Animal and
Grassland
Research and Innovation
Programme, Oak Park



The challenging market for dairy calves cannot help but influence the decisions that dairy farmers make during the breeding season. When discussing the issue with farmers at groups, the problem is as much one of calf marketability as it is one of calf value. Being able to sell calves quickly and easily is an important consideration with compactly calved growing dairy herds.

The initial reaction of some is to talk about “going all beef and buying in the replacements”. A more considered approach is needed because the breeding decisions made now will be felt for years to come. Consider the three-step approach to breeding as outlined in Figure 1.

Step one: how many heifers do you really need?

Did you know that around 35% of dairy heifer calves born fail to calve at two years of age? Around half of these never calve and the remainder calve at around three years of age. Have a look at your January 2019 cop performance report from AHI to see how you got on last season.

Improving your heifer-rearing skills will increase the proportion of heifer calves that give birth at around 24 months of age. This in turn will reduce the number of heifers calves required on your farm and increase the proportion of your herd that can be bred to non-dairy bulls.

Step two: choose the dams of the next generation of replacements carefully

Maiden heifers should be first in line when breeding the next generation of replacement heifers. They usually have the highest EBI and can be manipulated to mostly calve in the first two weeks of the calving season. As a

result, the calves born are high-EBI, early born and compactly calved. The range of suitable AI sires for replacement heifers has increased over the last number of years without compromising on EBI.

Next, select from within the dairy cow herd for cows that are early calving, high EBI and performing well. In compactly calved herds, that are not increasing in size, this means that a proportion of the mature cows can be bred to beef AI from the start of the breeding season.

Step three: choose beef AI using the dairy beef index (DBI)

The DBI is a breeding tool which aims to promote high-quality beef cattle being bred from the dairy herd with minimal consequences on the calving difficulty or gestation of the dairy cow. The DBI ranks beef bulls for use in the dairy herd, according to their genetic merit for calving and carcass performance traits:

Expressed in euro, each €1 increase in DBI can be interpreted as a €1 expected increase in profit for that bull's progeny; e.g. bull A has a DBI of €100 and bull B has DBI of €20. The progeny born to bull A are expected to generate €80 more profit compared to progeny sired by bull B.

Calving traits account for 64% of the average DBI value. The DBI selects for shorter gestation, easier calving and less calf mortality:

On the recommended bull file, lower values for all calving traits are more desirable:

If a bull's calving difficulty figure is 4%, then 4% of his calves are likely to require considerable assistance at birth. Increasing calving difficulty indicates that more calves will require considerable assistance at birth

Beef traits account for 36% of the average DBI value. The DBI selects for higher carcass weight and conformation, and more animals that meet minimum factory specifications (280 kg, O=). The DBI also recognises that some breeds are paid a premium

Figure 1: The three-step approach to dairy breeding

Step one: heifer numbers	Step two: dam selection	Step three: using the DBI
Minimise heifer losses between their birth and calving	Breed maiden heifers and the best cows to dairy AI	Use Dairy Beef Index to select beef AI bulls for the rest of the dairy herd

Hughie Egan who farms outside Ferbane in Co Offaly.



Table 1: DBI values, calving and beef values and reliabilities for similar DBI value beef AI sires listed on the current active DBI bull list

	DBI	DBI Rel	Calving value	Calving value rel	Beef value	Beef value rel
Sire A	€84	97%	€69	99%	€15	94%
Sire B	€83	72%	€49	93%	€34	50%

slaughter price and the DBI selects for reduced feed intake, as well as quieter and polled cattle.

On the recommended bull file, higher values for carcass weight and conformation are more desirable.

When using beef AI this spring:

- Choose beef bulls from the recommended bull list.
- To maximise probability, use bulls with higher DBI.
- To minimise calving difficulty, use

bulls with a lower calving difficulty value.

When selecting beef AI sires using the DBI, it is important to consider what components are contributing to an individual sire's DBI value. For example, the DBI, calving and beef sub-indexes of two similar DBI beef sires listed on the 21 March 2019 bull list are presented in Table 1.

Both sires have similar DBI values (€84 and €83 respectively). However, the calving value of Sire A is €69

while that of the sire B is €49 reflecting his slightly more difficult calving figures. Sire A is more suited for use on dairy heifers while sire B will be best used on cows with a proven track record of easy calving where he will sire calves of superior beefing merit.

Teagasc is collating a list of well-proven high DBI AI beef bulls for use on dairy cows and heifers this year. Contact your local dairy advisor for further information.



Continued on p8

FARMER PROFILE

Hughie and Sue Egan are milking approximately 80 dairy cows in Doon, outside Ferbane, Co Offaly. They have only 17ha that they can walk cows to, so a zero grazer is used to buffer feed cows at the shoulders of the year. Along with the 80 cows, they keep approximately 25 replacement units each year, with all other calves being sold at two to three weeks old.

Calf sales made up less than 4% of total farm sales for the Egans last year, yet Hughie is adamant that "this isn't the full story. The early sale of non-replacement stock allows me to focus all my energies on my herd of cows. I don't have the facilities or labour to keep beef calves for an extended period, so it is crucial that I have a customer for these calves".

"The buyer of our calves needs to make a margin too," says Hugh. "That's just common sense, if he or she doesn't make money they won't be back to buy calves the following year."

To help ensure they have repeat customers for their surplus calves, the Egans will aim to have a calf for sale that is both healthy and has as much genetic merit for beef as possible. Sue is in charge of calf-rearing duties and does not differentiate between how calves are treated.

"Each calf, whether it be a lower-



Jim Moyles and Hughie Egan discuss the DBI.

value beef calf or a higher-value replacement calf, gets exactly the same treatment from birth in terms of colostrum management, bedding, feeding, veterinary, etc," says Sue.

Beef AI

Hughie is no stranger to using Beef AI over the years. "Typically, we will purchase 100 dairy AI straws to use between cows and replacements (working out at approximately straw per animal) and then switch to beef AI once they are all used up."

Last year, a mix of Angus, Hereford, Limousin and Belgian Blue sires were used. This year, Hughie will be using the dairy beef index (DBI) to identify what beef bulls he uses. "I think the DBI is a great development for both dairy and beef farmers. I believe that by using bulls from the list and pointing these out to potential beef calf customers we will have an added advantage, when it comes to selling calves next spring. In turn, it should help them to make a profit too."

Business strategy course for farmers

The Teagasc/UCD Michael Smurfit Business School certificate in Business Strategy will be run again in 2019. The course is an exclusively business course and farmers with all enterprises have participated. The course has been run five times with over 100 graduates. The key benefits of participating are:

- The course is designed and delivered by lecturers from the Michael Smurfit Graduate Business School, Ireland's top business school and one of the world's leading business schools.
- Class size is small to ensure optimum in-class discussion and engagement between participants and lecturers.
- The course is practical - participants generate their own unique strategic plan for their business.
- Teagasc advisors mentor participants throughout the programme in producing their strategic plan.
- The course is accredited with UCD, so graduates receive a recognised qualification – Level 8 Certificate in Business Strategy (Farming).

"My dad Eamon was so impressed when he did the course that he convinced both myself and my wife Kalinda to do it together," says dairy farmer Darren Healy from County Wicklow. "It was both enjoyable and really worthwhile."

If you would like to learn more about the course please contact Mark Moore at Mark.moore@teagasc.ie or call 087 4179131



Back, from right: Frank Evans, Michael O'Gorman, John Moran, Shane Phelan and Andrew Cronin. Front: husband and wife Darren and Kalinda Healy

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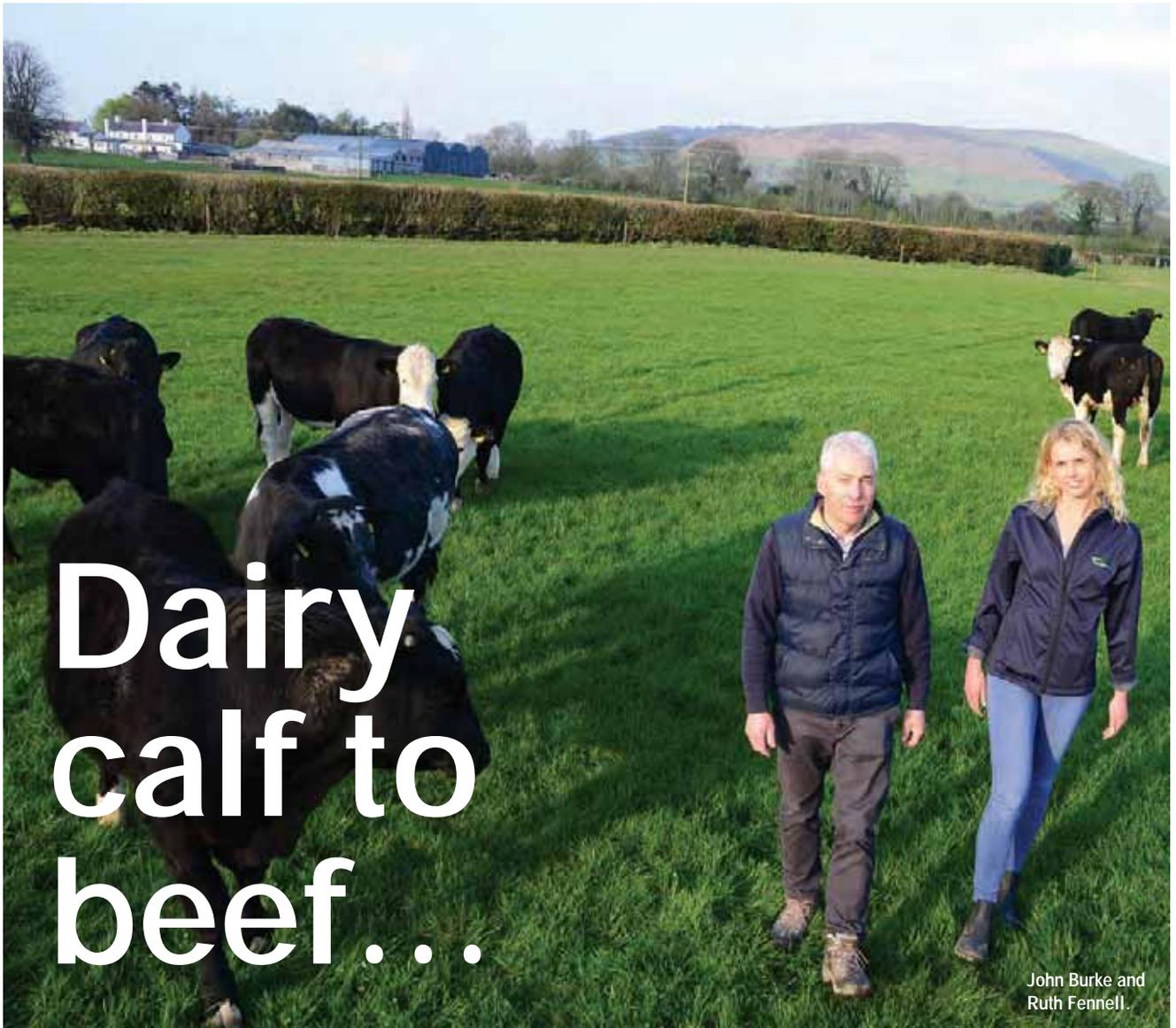
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Dairy calf to beef...

John Burke and Ruth Fennell.

Sucklers remain the core of the beef industry, but the dairy calf to beef sector is growing

Ruth Fennell, Research Technologist, Teagasc Animal and Grassland Research and Innovation Programme.

With the national dairy herd already at over 1.5 million cows and growing at 2% annually, there is an increasing supply of calves available for rearing and finishing on beef farms. Estimates suggest that there will be over 1.2 million beef- and dairy-bred calves available from the dairy herd by next year.

In contrast, the national suckler herd is predicted to decline over the coming years and has already dropped below one million cows.

Some beef farmers have already switched from suckling into pur-

chasing dairy-bred calves or expanded their current beef enterprise by buying extra calves to supplement their stock numbers.

John Burke, Wicklow

"It has been a gift of a spring!" says tillage and beef farmer John Burke. Living in the foothills of Wicklow near Baltin-glass, John operates a mixed enterprise of approximately 90 acres of tillage (Martin Bourke is his Teagasc advisor) and keeps 250 beef cattle run over 120 acres of grassland.

John's farm enterprise has evolved over the years. "In the early 1980s, alongside a small sheep enterprise, I bought reared Friesian and Hereford bull calves and finished them as bull-ocks. I also purchased and finished Limousin store cattle.

"In 1991, I moved into a suckler

DairyBEEF2019, a dairy calf to beef Open Day, will take place on Tuesday, 21 May, at Teagasc, Johnstown Castle, Co Wexford, 11am.

system with 50 cows, mainly Limousin and Simmental, which were bred to a Belgian Blue bull.

We sold most of the calves as weanlings. In the early years there was a good export market for good-quality weanlings and we made the most of it."

In his current system, John buys in dairy-bred Angus bull calves, the majority of which come from Kerry and Cork.

"The first year I reared 60, then 100, then 200," he says. "Last year, I bought reared calves, but we had a number of losses, so this year I have gone back to rearing them myself.

"I have 100 calves this year, sourced through a calf merchant. I get all my calves at the same age (four weeks old) in large groups in a short space of time, which makes life easier for me. Without Bob, who works along-

side me, it wouldn't be possible for me to rear them all myself."

John finishes his cattle at 22 to 23 months of age, achieving a 335kg carcass, O=/+ conformation and 3+ fat scores.

"Although we do get O- grades, we also get R- grades. That's all down to the style of calf you buy from the start. The inputs are quite high; the calves are weaned at 10 to 12 weeks of age, having been fed milk replacer once a day from six weeks of age.

"I vaccinate all the calves against pneumonia and IBR and also dose preventatively for coccidiosis. They go to grass in May/June, and receive a nut ration *ad lib* for six weeks before being brought back to 2kg/day for the summer."

When John got back into dairy-beef, he changed to a paddock grazing system, which has been a great success.

"I am growing far more grass and I have increased grass utilisation across the farm. The paddock system is more labour intensive, but it's the only way to get the most out of the grass that you have. Any surplus grass is cut and baled. We also make hay, which we sell for horses.

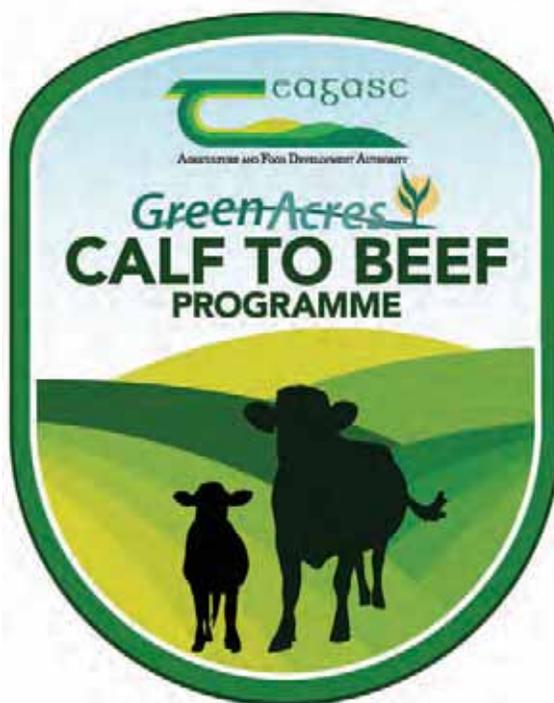
"I grow 10 to 11 acres of Redstart, sown after the winter barley. The yearlings are wintered outside on the Redstart, baled silage and 2kg meal/day. They do very well on it; they are much healthier outside and are great weights going to grass in the spring – in March the yearlings are 400kg on average."

John starts his finishing period in late summer, "I start introducing meal in July, around 2kg/day, which increases to 6kg to 7kg/day. The aim is to have the cattle gaining a minimum of 1kg per day, meaning they should be nearly 650kg at slaughter in November.

"Some of the stronger cattle may finish before winter housing, but that really depends on the year and weather conditions. The majority will be housed for a short period, fed silage and *ad lib* meal, and killed by Christmas.

"I am happy rearing 100 calves and purchasing some store cattle to finish in the summer time. I was very heavily stocked three years ago, with nearly 450 head of cattle, and I found that I was grazing paddocks out too tight and the cattle didn't thrive as well.

"Having enough good grass, and utilising it well, is crucial to keeping costs down at all times. Managing calf health in the early days is always a challenge."



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Continued on p12



Jarleth Ruane recently showed Teagasc regional manager Vivian Silke around his calf to beef system near Corbally, Claremorris, Co Mayo.

Green Acres

Jarleth Ruane farms 25ha near Corbally, Claremorris, Co Mayo. After graduating from Mountbellew Agricultural College in 2018, Jarleth decided to get more involved with the running of the home farm alongside his father Austin. His system is to produce 20- to 24-month steers. His Teagasc advisor is Geraldine Hynes.

As one of 14 demonstration farms within the Teagasc Green Acres programme, Jarleth and Austin work closely with Teagasc programme advisor David Argue.

"The aim of the programme is to advise and demonstrate best practice at farm level on the sustainable rearing, growing and finishing of purchased

dairy-bred calves through to beef (steers/heifers/bulls) on a whole-farm basis and to demonstrate the associated economic benefits," says David.

"We bought our first 10 dairy-bred calves in 2016 and after we reared them successfully, we decided to further increase numbers in 2017 and 2018 and we plan to rear 60 calves in 2019," says Jarleth. The farm is made up of three blocks of land; two owned (18.5ha) and one leased (6.5ha) and is currently stocked at 2.8LU/ha.

Predominantly, Jarleth has been purchasing Aberdeen Angus, Friesian and Friesian-cross-Jersey bull calves along with 30 to 35 continental store cattle each year bringing all to slaughter.

"Buying these store cattle in the spring time can tie up a lot of money, so

we are considering increasing calf numbers and reducing the amount of store cattle being bought," continues Jarleth. "We also have a small sheep enterprise on the farm which aids cashflow when cattle sales are low."

A good paddock system, including water troughs and road ways, has been implemented on the farm recently. This allows ease of movement of cattle, good grassland management and herding simpler for Jarleth and Austin as they both work full-time off-farm.

"The fact that our land is in three well-separated parcels means we have some challenges," says Jarleth. "But with support from Teagasc we are optimising our system and reaching good margins for a beef system."

Beef production: how to make a profit

Per hectare output, physical and financial, is key

Aidan Murray

Beef specialist, Teagasc Animal and Grassland Research and Innovation Programme.



The last nine months have been extremely difficult for beef finishers. With a total kill of 1.8m head in 2018, increased slaughterings in 2019 and the continued uncertainty of Brexit have all impacted on price. Out-of-spec cattle, as was the case in the spring of 2014, have been experiencing long delays before slaughter.

Generally, there has been a lot of talk about the lack of profitability in the beef sector and, in particular, the suckler herd. To state the obvious, profitability in any business sector is key to its long-time sustainability.

This prompted a review of what has been happening with regard to on farm profit over the last decade. Teagasc has been completing profit monitors since 2002 so we have gathered a great deal of data. The data provides a clear indication that gaps are widening between the top performers and those who are classified as average within their respective beef systems.

Table 1 outlines the financial performance of 620 suckler to beef farms who completed a Teagasc profit monitor for 2017.

As is evident from the table, the bottom third in the system made a net loss from production of €163/ha and had to dip into their premia to support their production costs. The average farm in the group made a modest net profit of €145/ha from production and topped this up with €486/ha of premia.

The top third on the other hand made as much from production (€493/ha) as they did from premia which, when combined, gave a net profit of €982/ha.

Encouragingly, the top herds are seeing a return from improved efficiency from production. They are achieving good output on a livestock unit basis

Table 1: 2017 profit monitor results – suckler to beef (n=620)

	Top 10%	Top 1/3	Average	Bottom 1/3	Bottom 10%
Stocking rate (LU/ha)	2.6	2.3	1.9	1.6	1.5
Kg beef / ha	1,038	855	613	405	366
Net profit (excl. premia)	€816	€493	€145	-€163	-€460
Total premia	€539	€489	€486	€477	€454

Table 2: 2017 profit monitor results – non-breeding farms (n=513)

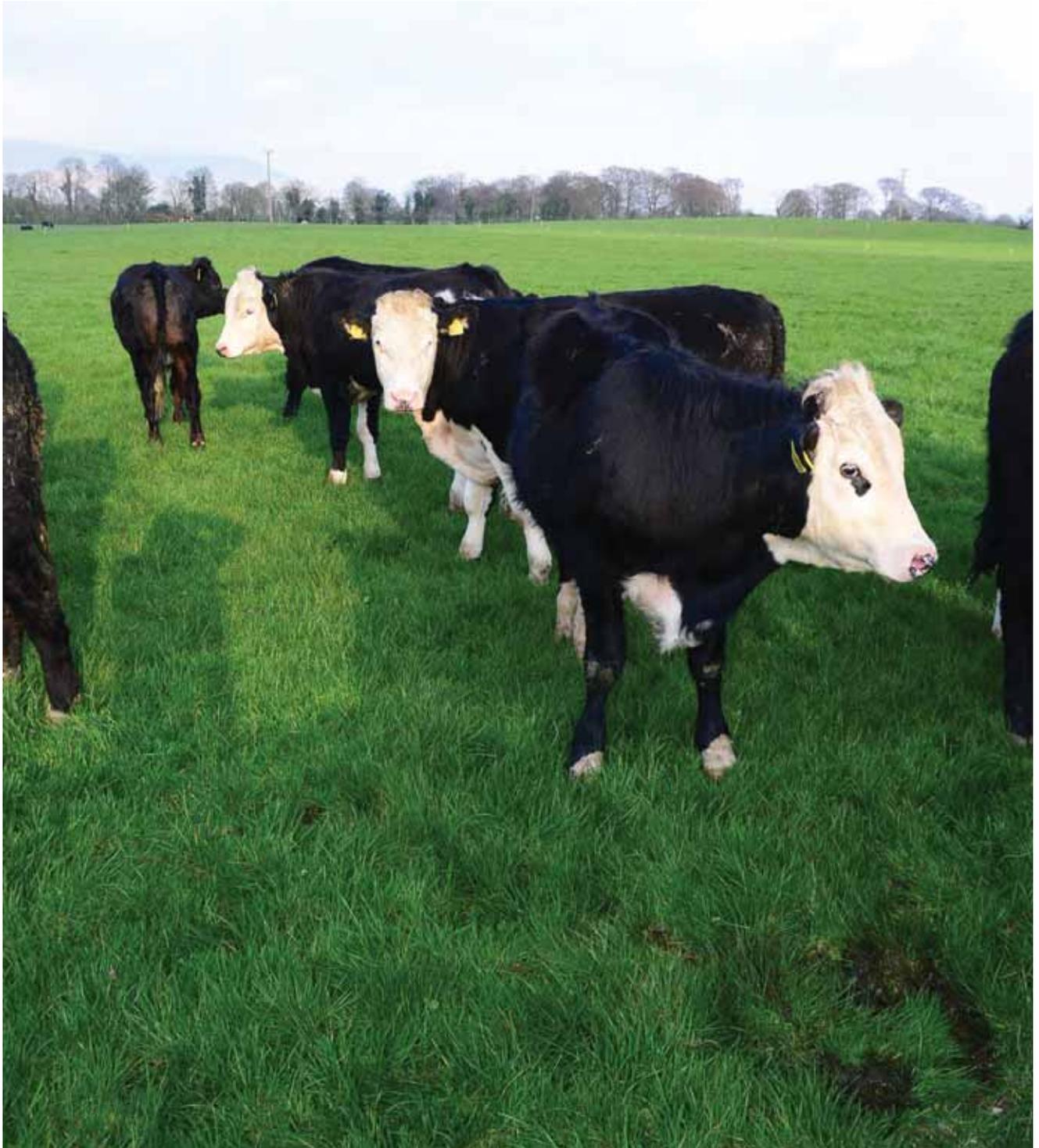
	Top 10%	Top 1/3	Average	Bottom 1/3	Bottom 10%
Stocking rate (LU/ha)	2.5	2.2	1.8	1.4	1.4
Kg beef/ha	1,481	1,097	735	453	441
Net profit (excl. premia)	€1,154	€714	€236	-€229	-€532
Total premia	€470	€452	€460	€464	€479

Table 3: Profitability 2008 v 2017- top one-third of farms comparison

	Suckling to beef farms		Non-breeding farms	
	2008	2017	2008	2017
Total number of farms	252	620	53	513
Stocking rate LU/ha	1.95	2.3	1.61	2.2
Kg beef Lw/ha	637kg	855kg	706kg	1,097kg
Gross output €/ha	€1203	€1932	€1309	€2402
Net profit/ha	€61	€493	€83	€714
Premia/ha	€645	€489	€826	€452



Continued on p14



first, and then they have the land available to increase stocking rate. This allows them to sell over 855kg of live weight per hectare which is a crucial component in generating profit.

It is a similar picture for the 513 non-breeding farms who buy weanlings, stores or run calf-to-beef systems. The lack of output on the bottom third of farms again sees a loss from production of €229/ha. The average farm produces a modest profit of €236/ha from production. The top third of farms generated €714 net profit before premia. When premia are added the overall net profit rises to €1,166/ha.

The top non-breeding farms are again becoming efficient on a per-livestock unit basis and then scaling up by increasing stocking rate. Non-breeding farmers have the potential to generate more liveweight per hectare because the animals they buy have the potential to gain weight every day from when they arrive until they go out the gate.

The suckler systems, on the other hand, have to maintain the cow, who in her own right doesn't add to liveweight output given the cyclical nature of suckling.

Table 3 compares what has happened on the top third of beef farms

in the suckler to beef and non-breeding systems regarding financial performance in 2008 versus 2017.

The first striking feature of the table is that in both systems they have increased stocking rate – from 1.95lu/ha to 2.31lu/ha on the suckling farms and from 1.61 to 2.2lu/ha on the non-breeding farms. This is an increase of 17.9% and 36.6%, respectively.

This has resulted in a higher number of kilos of liveweight per hectare being sold of the farms. The value of this output in monetary terms has also increased. This increase, of 60.5% and 83.4% on suckler and non-breeding farms respectively, reflects

an increase in the beef price, and also the extra beef sold off these farms.

The improved efficiency and output achieved over the period has manifested itself in such a way that in 2008 the top third of suckler to beef farms achieved a net profit from production of just €61/ha and on non-breeding farms €83/ha.

In 2008, premia accounted for 91.6% of total profit/ha on suckler farms and 90.9% on non-breeding farms. Contrast that with 2017 where total profit derived from premia was 49.8% on suckler farms and 38.8% on non-breeding farms.

The top third of farms in each of the two systems have demonstrated that with improved efficiency and cost control they have been able to deliver more profit from production, as they have seen their premia take eroded.

Implications

The farms in both systems that have run with improvements in efficiency on a per-animal basis firstly and then scaled it up by raising stocking rate have demonstrated that they can derive higher profits from production.

This is important given that we have already seen erosion in the levels of premia paid to beef farms. Convergence in any new CAP may further accelerate this. Farms that have the ability to drive efficiency, through both physical and financial output, must continue to do so.

The average farms over the same period are still only making a modest profit from production and in a difficult year have struggled to breakeven on production.

These farms, for whatever reason, be it land type, availability of capital for investment or off-farm work, have not been able to generate sufficient output either physical or financial to give themselves a chance to be profitable.

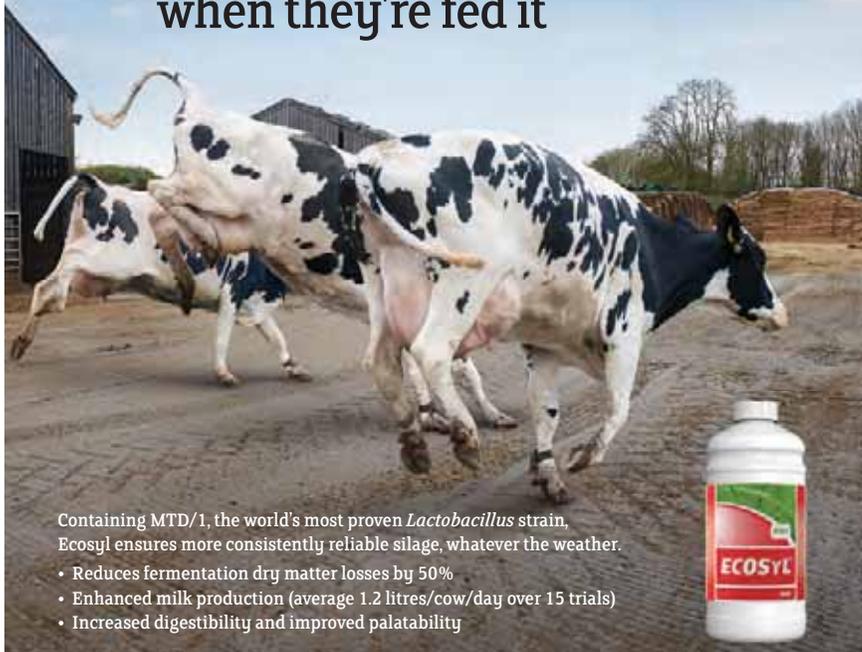
These farms are important and many are efficient on a livestock unit basis but their focus should probably be more on cost control and becoming as efficient from a labour point of view as they can be.

Supports will remain an important income source for many in the beef sector in the future. To help improve confidence in the sector, it is important that some indication as to how and the degree of support intend under any new CAP is communicated as quickly as it is known.

If the protected geographical indication (PGI) can be established for beef from the suckler herd, resulting in greater profitability, it could provide a welcome boost to the sustainability of the sector.



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Why kale is A-OK

Hailed as a superfood for humans, kale is also enjoyed by cattle on one south Galway farm. The crop is proving an ideal entry for a new grass sward, writes Teagasc Athenry's Mícheál Kelly

Enda Linnane, who farms near Kinvara, Co Galway, has a flock of 65 early spring-lambing ewes, 20 hoggets, 30 spring-calving suckler cows and finishing cattle. With a difficult year behind him, and Brexit looming, Enda is cautious: "With prices as they are and the overall future outlook, we need to keep a keen eye on costs while maximising

the performance of stock at grass. That means reducing concentrates."

The farm is in the limestone region of south Galway, where soils are shallow and grassland management is challenging.

"With limestone so close to the surface, the farm is generally drier and benefits from earlier spring growth, but in scenarios like the drought of 2018 we are the first to take a hit," says Enda. "Due to a complete lack of rainfall, grass growth just stopped for a number of weeks last year. This quickly led to a grass deficit on the farm; and although grass growth exploded once the rain returned, the effects of the drought had a severe impact on total annual grass production."

A solution

Last year hammered home the importance of grassland management, and Enda is now involved in a local grass group and regularly measures grass on his farm.

"We need to be better at forecasting grass deficits and identifying surpluses which can be taken out as bales,"

he says. "Reseeding is essential."

Soil fertility is constantly monitored by soil testing – fertiliser and slurry are applied accordingly. Early lambing and prioritising weanlings from the suckler herd in the back end of the year, means dry matter (DM) performance in the 'shoulders' of the year is crucial. To help with this, Enda incorporated kale into his reseeded programme last year.

"It was a field where some reclamation work had been completed," says Enda. "The old sward was difficult to break down, so we decided to set kale in the field. We hoped grazing the crop in-situ over winter would help to break down the old sod before reseeding it back to grass this spring."

The annual average grass growth on Irish farms is 7t DM/ha over 12 months. Incorporating kale into the mix allowed Enda to grow more than the equivalent of this in a period of just five months. This relieved the grazing pressure on the farm after the summer drought, as it allowed areas which would usually be closed for second-cut silage to be kept solely for grazing for the remainder of the year.

Growing kale

Kale is generally sown in May and June, for feeding between November and February. To achieve high yields, kale should be sown by mid-June, as the crop will take approximately 150 days to mature. Sowing kale after mid-June leads to a lower dry matter (DM) yield, which puts the viability of the crop in question, as opposed to a direct reseed. Sloped or wet fields are unsuitable due to the risk of run-off from the crop; a potential breach of cross-compliance regulations. A suitable lie-back area from the crop should be available for stock at all times.

Kale requires a soil pH of 6.5-7.0. Compound fertiliser is normally broadcast on the seedbed at sowing. Assuming an index 3 soil, a kale crop will require 30kg/ha of phosphorus and 170kg/ha of potassium. The overall nitrogen demand will be 130kg/ha, with some of this applied at sowing and the remainder as a top-dressing once the plant has emerged.

A crop of kale is capable of produc-

ing 6-10t DM/ha, with a feed value similar to that of early spring grass. Kale is a high-energy feed source (1.12UFL), with a crude protein level of 16%-18% and a dry matter digestibility of >80%. Kale has a high sugar content but it is low in fibre, and therefore should not make up more than 70% of the total dry matter intake of the animal.

In order to keep the rumen functioning and to prevent acidosis, kale should be supplemented with either hay, straw or silage. This 'long forage' helps prevent digestive upsets. It is also important to introduce kale into the diet gradually, allowing only a one to two-hour access period

on the first day, and building this up over the first week to 10 days. By then, the animals' rumens should have adapted to the new diet.

Utilisation of the crop will vary from farm to farm, but with good management over 80% can be achieved.

Utilisation rates tend to be poorer early in the grazing period, but improve over time as the animals adapt to the new diet. The direction

in which the kale is grazed has a large impact on the utilisation rate.

Ideally, kale should be grazed in long, narrow strips. In this scenario, the fence only needs to be moved in as far as the edge of the kale each day.



Feeding kale

Feeding kale takes careful management.

"The cattle will graze under the wire once it is placed at the edge of the kale," says Enda. "If you set up short, wide strips the fence must be placed further into the crop. This will lead to increased trampling of the crop and wastage, as well as possible issues with the wire earthing off the crop unless a path is cut through the kale beforehand."

The daily allocation will depend on the feeding rate and the animal performance required. Outwintered cattle should be offered approximately 3% of their bodyweight in dry matter (DM) each day. The higher intakes are as a result of an animal's higher maintenance requirements outside. For a 300kg weanling, this equates to 9kg DM/day.

As kale should make up no more than 70% of the animal's dry matter intake, the weanling's diet will consist of 6.3kg DM of kale and 2.7kg DM of silage each day. Assuming the kale crop produces 8t DM/ha, with a utilisation rate of 80%, 6.4t DM/ha is being consumed by the livestock. On this basis, each hectare of kale has the ability to feed 25 weanlings (300kg liveweight) for 41 days.

"Last year's kale has now been grazed out fully and will shortly be tilled and returned to grass," says Enda.



Brendan and Enda Linnane on his farm near Kinvara, Co Galway.

"We'll use the Pasture Profit Index to select grass varieties which meet the demands of our system. The field is close to the yard and will be predominantly used for grazing and we plan to sow a mixture of at most four varieties, with heading dates within a week of

each other and strong characteristics for spring and autumn growth.

"So kale delivers for us on two levels, as a source of dry matter and by providing a good start for new grass swards. It is a key part of our system now."

Grass driving profits for this Kerry farmer

Frank Campion, Michael Gottstein, Kevin O'Sullivan, Teagasc

Tomás O'Leary, Grass 10 Sheep Farmer of the Year for 2018, runs a mid-season lambing enterprise and a new contract rearing venture near Killarney.

"Our land is in two blocks on either side of Killarney, with the majority of the grazing taking place on the block near Rosnacarton, Beaufort," says Tomás. This spring he lambed approximately 300 ewes, including 75 yearlings at a stocking rate of 12 ewes per/ha.

Tomás O'Leary

The high output flock is made up of Belclare and Suffolk cross ewes and is consistently achieving litter sizes between 2.0-2.2 lambs per ewe for the mature stock and more than 1.5 for the yearlings. The mature ewes lamb from the start of March, to Belclare and Suffolk rams.

"We manage these ewes and their lambs in two groups without supplementation during the main part of grazing season," says Tomás. "The yearling ewes lamb from 17 March to Charollais rams. They are managed as a separate group up to weaning and the lambs get concentrates."

From September/October onwards, light lambs are supplemented with concentrates, with some lambs stored over winter and sold from February to April. Tomás is actively involved in the Ring of Kerry quality lamb group, through which approximately half of his lambs are sold.

Changing beef enterprise

"In recent years we have moved from a suckler cow beef enterprise into trading beef systems, including fattening beef heifers and a dairy yearling to beef system," says Tomás. "However, while both systems worked quite well in the beginning, beef price potential and issues with replacing stock showed the return from either system will be below our gross

margin target for the farm."

In autumn 2018, Tomás began contract rearing dairy heifers, with the cattle arriving at six months old and leaving the farm again at housing time. The target stocking rate for the beef enterprise on the farm is 2.5LU/ha.

Grassland management

The key to profitability on Tomás' farm is achieving high levels of grass growth and utilisation to facilitate his high stocking rates. Sheep graze up to nine months of the year, which demands good grassland management all year round.

"Since joining the BETTER farm sheep programme in 2014, we have made a number of changes to the sheep enterprise," says Tomás. "A key point is that lambing date has been pushed back to the start of March to match grass growth. As a result we've been able to reduce the amount of concentrates fed to ewes, while also improving soil fertility and grazing infrastructure."



Grazing Infrastructure

"We now have three-times as many field divisions as we had just a few years ago," says Tomás. "We have permanent and temporary fencing which allows for shorter grazing periods. This protects re-growths and helps us to achieve better grazing management and animal performance."

"We have approximately 18 paddocks on the farm, with an average



Tomás O'Leary, Grass 10 Sheep Farmer of the Year for 2018



The high output flock is made up of Belclare and Suffolk cross ewes and is consistently achieving litter sizes between 2.0-2.2 lambs per ewe for the mature stock.



Farm map of Tomás's main grazing block (above).



An example of some the fencing done by Tomás to improve his grazing infrastructure (below).

size of 1.7 ha. Within these paddocks, temporary divisions are used as required particularly during the spring/summer period with the water system on the farm laid out to suit this. Both cattle and sheep graze together, with the target stocking ratio of 60:40 of sheep-to-cattle on the farm.

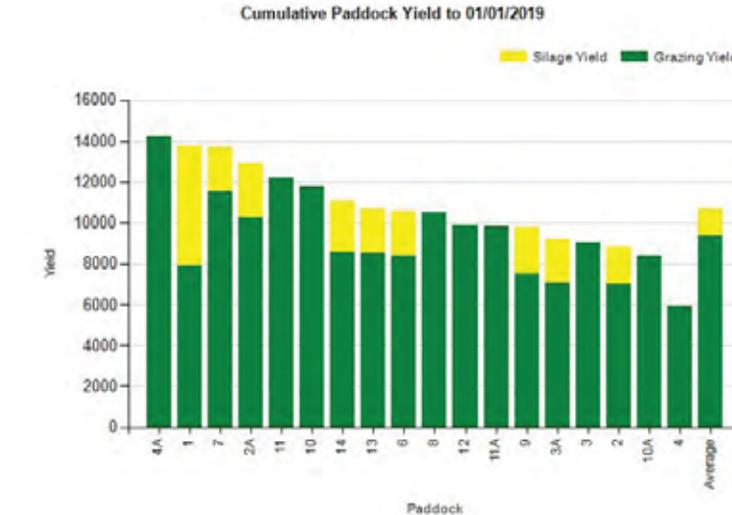
Soil fertility

The entire farm was soil sampled in 2014 and lime was spread in response to low pH readings. A nutrient management plan was put in place on the back of the soil test results and it is adjusted when new soil samples are taken, typically every two to three years. The nutrient management plan aims to maintain soil pH and to bring soil P & K levels to target Index 3.

Fertilizer is applied regularly during the year in order maintain grass growth and quality. Information generated as a result of weekly grass measurements is used to help inform decisions around spreading fertilizer.

Managing grass supplies

"We measure grass throughout the year with the grass heights entered into PastureBase Ireland," says Tomás. "The information generated by the programme allows me to make informed grazing decisions, such as when to drop out paddocks for silage,



when to apply fertilizer or if supplementation is needed to deal with a grass deficit."

As can be seen in Figure 1. Tomás grew over 10t of dry matter/ha on average last year, despite the difficult season. However, it was down from the 14t he grew in 2017.

"The data collected on PBI also allows me to identify paddocks which are performing poorly and need reseeding. "Grass seed mixes are based on the Pasture Profit Index and

include diploid and tetraploid varieties."

Grass 10 Sheep Farm Walks

As part of the summer Grass 10 sheep farm walks Tomás will host a walk on his farm near Rosnacarton, Beaufort, Co Kerry on 19 June at 7pm. The event will focus on Tomás's grassland management and what he has done to get where he is today. This is sure to be an excellent event and all are welcome to attend.

Spring barley disease control – taking an IPM approach

Can two farmers spend the same amount of money on fungicides as their spring barley crop but get different results? The answer is YES.

Ciaran Collins
Tillage specialist Teagasc Crops, Environment and Land Use Programme



In the Teagasc Profit Monitor results from 2017 the average spend on fungicides on spring barley was €86/ha. Over the course of this article, we will look at how the adoption of Integrated Pest Management (IPM) techniques can help you reduce the amount of fungicide you use, while gaining maximum return from your investment.

All professional users, predominantly farmers, are required to apply the general principles of Integrated Pest Management (IPM) under the Sustainable Use Directive (SUD). Many of these measures are already practiced on-farm and all that is required of many farmers is to record that they are actually doing them.

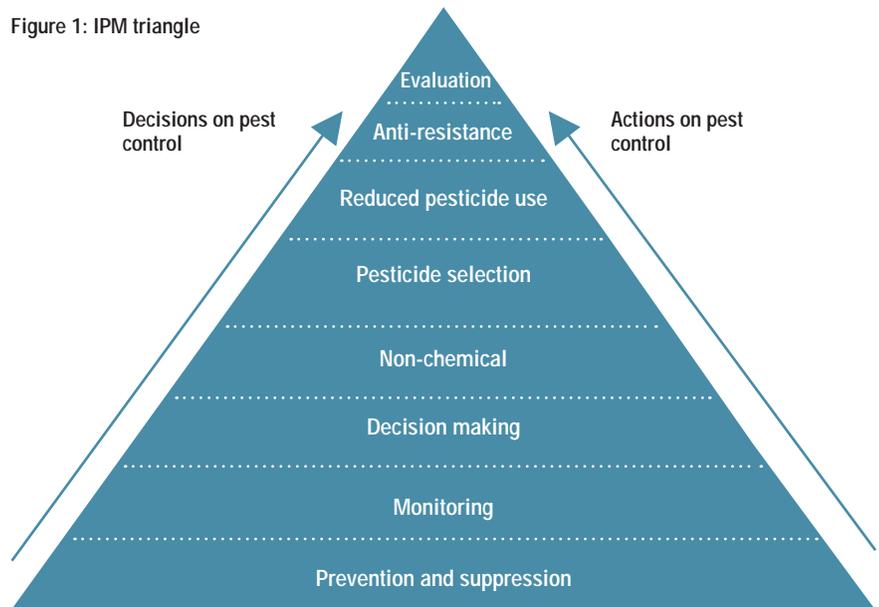
Prevention and suppression is the biggest and most important part of the IPM triangle (see Figure 1), where crop rotation and varietal disease resistance scores are important factors. But in May and June the focus for spring barley growers turns to fungicides, and how to make best use of them.

How fungicides are used is a key part of any IPM strategy. This involves the decision making process about whether a fungicide is required or not; fungicide selection; the rate and timing of application on the crop. Equally important is employing an anti-resistance strategy which is vital to prolonging our existing fungicides.

Components of yield

Barley yield is closely related to grain number/m². The main factor influencing grain number is the number of ears/m². Barley cannot compensate for lower ear numbers,

Figure 1: IPM triangle



Key IPM measures around fungicide application

- Use fungicides that are as specific as possible for the target disease,
- Use fungicides to the necessary levels,
- Use a diversity of fungicides,
- Use anti-resistance strategies to maintain the effectiveness of products,
- Record the success of the applied fungicides.

“Barley cannot compensate for lower ear numbers, like wheat can, so the focus of disease control time in barley is earlier, to ensure tillers survive and result in the optimum ear number

like wheat can, so the focus of disease control time in barley is earlier, to ensure tillers survive and result in the optimum ear number.

IPM – correct timing

Research carried out at Teagasc Oak Park from 2012 to 2015 investigated the impact that various fungicide timings had on a yield of spring barley. The research compared the

traditional timings of GS 31-32 (stem extension) and GS 59 (ear emergence) to earlier timings of >GS30 (mid/late tillering) and GS 39/45 (flag leaf/awn emergence).

The research found that there was yield penalty of over 0.5t/ha by delaying fungicide application from the traditional timings.

IPM – Product mix and rates

Two important IPM measures emerged from the research;

• **Product mix:** as part of an anti-resistance strategy a minimum of two actives should be included at each timing.

• **Rates:** no more than half the rate of any individual product is required.

Farmers can purchase fungicides in two ways: the straight product on its own e.g. Proline or a pre-formulated mix like Siltra, which contains Proline and an SDHI. A good anti-

Spring barley fungicide response



Figure 2: Impact of delayed applications of fungicides on spring barley

Table 1: Spring Barley Fungicide Programme

Timing	Target Diseases	Programme
Tillering GS <30	Rhyncho Net Blotch Brown Rust Mildew	Mixtures: Azole/Strob/SDHI. Mildewicide where required.
Awn emergence GS 39-49	Rhyncho Net Blotch Brown rust Ramularia Rust	Chlorothalonil 1.0 L (All mixes) + Mixtures: Azole/Strob/SDHI Mildewicide where required.

resistance strategy will have two actives that have activity on the target disease.

So, in the case of Rhyncho this could be Proline and an SDHI. Whether the farmer uses a pre formulated product or purchases the 'straights' separately, it doesn't matter once there are two actives in the mix from different groups, with activity on the target disease. The research also proved that there is no advantage in using any more than half the rate of each component of the mix. This ties in with the IPM principle of using fungicides to the necessary levels.

Ramularia control in 2019

Ramularia is a key disease for spring barley growers and, left uncontrolled, can lead to large yield reductions. Varietal disease resistance will form part of the IPM strategy in the future but currently we do not have enough information on varietal resistance

to ramularia, so an application of Chlorothalonil is essential at the final timing for control. It is vital that it is applied prior to the development of symptoms.

Typical symptoms of ramularia are small brown rectangular lesions surrounded by a yellow halo. One of the distinguishing features of ramularia is that it can be seen through the leaf. Sometimes symptoms can be seen on lower, dead leaves, but normally symptoms appear post flowering.

Evaluation

The tip of the IPM triangle is evaluation. While you are required under cross-compliance to record pesticide use, evaluation of the success or otherwise of the fungicide programme is an important final step. This IPM measure will inform your future decision making on whether further reductions in fungicide use are possible.

Chlorothalonil

The European Standing Committee on Plants, Animals, Food and Feed (SCoPAFF) has voted against renewal of approval of the fungicide Chlorothalonil.

No dates are confirmed but it will be available for this season. Chlorothalonil (often referred to as Bravo) is a key active ingredient for the control of ramularia in barley and it is an important part of an anti-resistance strategy in wheat.

Teagasc produced a report last autumn on the possible implications of the loss of chlorothalonil. One of the key points from the report was, where chlorothalonil is not available, the report estimates the most likely scenario for e-Profitor monitor farmers is an average net margin reduction of over 50% in wheat and 65% in barley.

The report also states that in the medium term the introduction of new fungicides will be welcome and will increase disease control options.

However, in the absence of chlorothalonil a more rapid loss of efficacy of these fungicides is expected due to high disease pressure.



Figure 3: Ramularia – Chlorothalonil is essential for control in 2019.

Know your enemy: grass weed identification

Jimmy Staples

Enable Conservation Tillage Project advisor

Ronan Byrne

Walsh Fellow, Teagasc Oak Park

Weeds compete with crops for light, water and nutrients, reducing yields. In order for any crop, regardless of establishment system, to reach its full potential, weed control must be effective.

Accurate identification supports the development of a robust weed control strategy comprising both cultural and chemical elements built around the biology of the target weed. Grass weeds are easily identifiable after heading out by examining the head structure.

But at this stage, the only control options available are rogueing or crop destruction in order to prevent seed return. It is important therefore to record and map these weeds so that they can be controlled in the following crop.

Ideally, an integrated pest management (IPM) strategy should be developed after identification of the grass weed at the earliest possible stage.

This strategy should focus on:

- Depleting the seed bank.
- Killing weed seedlings.
- Stopping seed set.
- Preventing seed return.

To be truly effective, an IPM strategy needs to be planned over the whole rotation and not just in the current and following crop. A rotation that includes non-cereal crops, combined with the use of stale seedbeds and delayed sowing of winter cereals, are just some actions that can be implemented in the case of autumn-germinating grass weeds.

Grass weeds are easiest to control with herbicides up to early tillering. However, it is at these early stages of their growth cycle in autumn and early spring when accurate identification can be difficult.

There are a number of key identifiable characteristics to look for when identifying grass weeds in these early stages of growth:

- The youngest leaf – is it rolled or folded?
 - The presence, shape and size of the ligule at the base of the leaf.
 - The presence or absence of auricles, which wrap around the stem at the base of the leaves.
 - Characteristics such as leaf colour, colour at the base of the stem, growth habit and hairiness of stem and leaf can be quite variable, but useful identifiers.
 - Presence of rhizomes and stolons.
- The key is to rely on multiple traits, not just one, when identifying a grass.

Identifying sterile and great brome

After heading out, both species have wedge-shaped long, spreading awns. At the vegetative stage, sterile brome can be hairy, but great brome is visibly hairy.

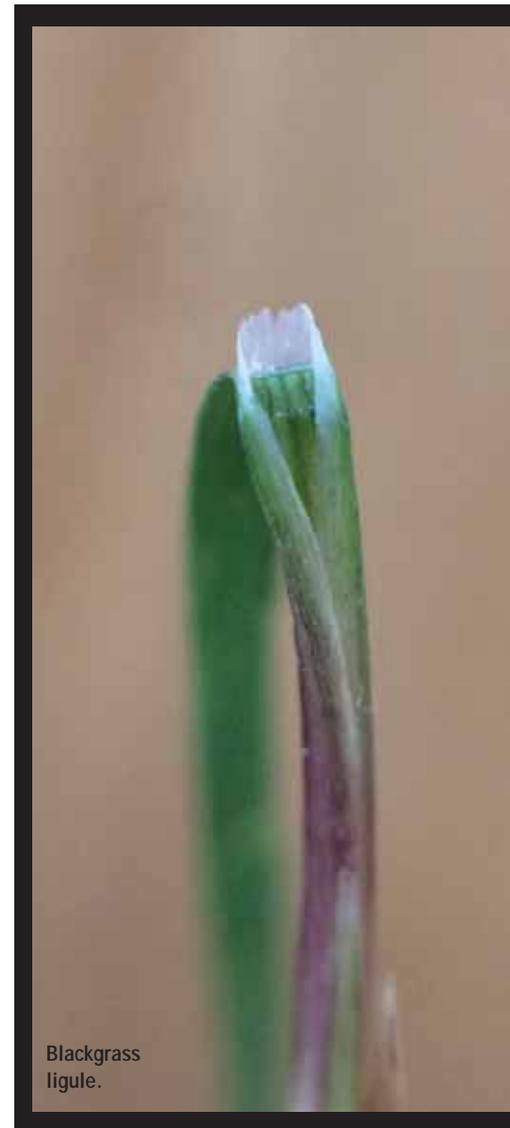
Both species can have purple/red striping down the leaf sheath. Sterile brome has a serrated ligule and no auricles. Great brome grows in a more upright manner than sterile brome and is generally a larger, more robust plant. In great brome the axis (see picture) of the panicle is hairy, whereas in sterile brome it is not.

Identifying rye brome

Rye brome is a rather upright, sturdy grass. After heading out, seeds are arranged in loose panicles. Cutting a mature rye brome seed across its cross section reveals a deep V or U shape.

This is in direct contrast to soft and meadow brome, which are characterised by their saucer-shaped cross sections. Furthermore, comparing the spikelets of rye brome with meadow and soft brome also reveals slight gaps between the seeds, which are not seen in the more compact spikelets of these other two brome species.

Identifying soft and meadow brome



Blackgrass ligule.

Soft brome is more common on uncultivated land than in fields where soil disturbance is common. Meadow brome is the only brome species that has rhizomes. This is a crucial identifying characteristic.

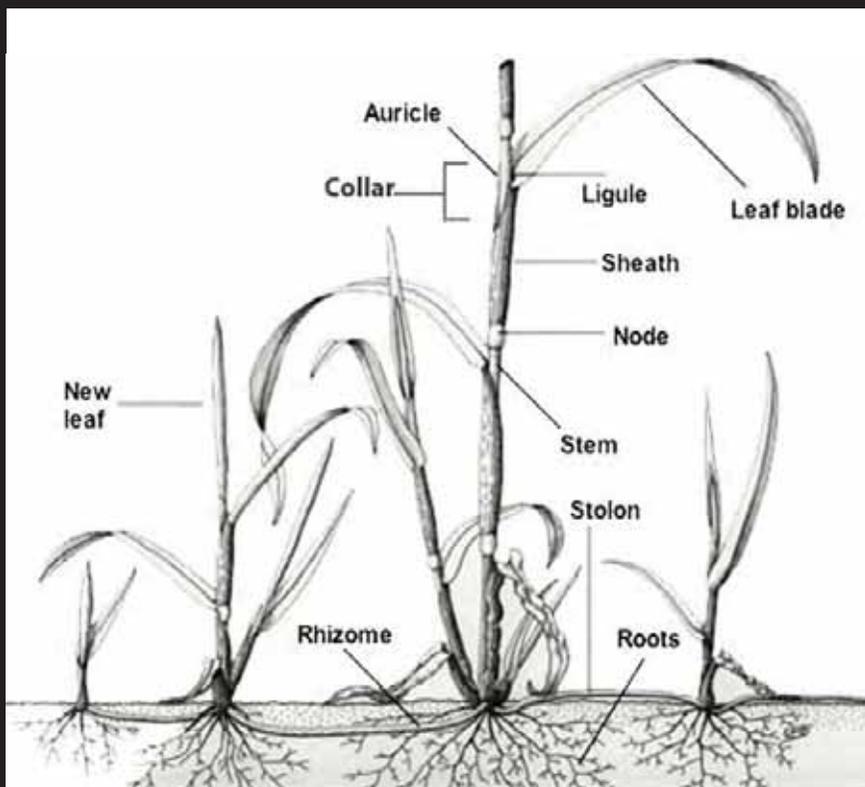
Soft brome has no auricles and a short, flat ligule. Similarly, meadow brome has no auricles, but has short to medium feathery, pointed ligules. Soft brome has soft hairs over the whole plant. Meadow brome has a hairy leaf sheath.

If plants survive to seed production, these species can be tricky to tell from one another. Soft brome has a looser panicle, with longer pedicels (branches) than meadow brome.

Furthermore, soft brome spikelets are typified by soft hair, whereas meadow brome spikelets are hairless.

Identifying black grass

Black grass grows in a very upright manner, with long slender leaves with no hair. The leaf sheath is smooth and hairless, and can range in colour from green to purple. Black grass has no auricles, with medium flat, finely serrated ligules.



A key characteristic to look out for, for simple identification/differentiation from young cereal plants, is the purple colour at the base of black grass stems.

This characteristic can be variable among populations and not all plants will have this colouration. However, if it is noted, it is a quick tell-tale sign that there are alien plants growing in a field with young cereal plants.

The mature black grass spikelet is slender and cylindrical, sharing similarities with common foxtail and timothy.

Black grass seed heads are much thinner than these aforementioned grasses. For further differentiation, common foxtail has rhizomes. Black grass produces large amounts of seeds. Mature seeds range in colour from yellow to purplish.

This grass is notorious for its resistance to herbicides and this is a growing issue in Ireland. A zero-tolerance approach is a must for this weed, so accurate identification is crucial.

Identifying lesser canary grass

Lesser canary grass is somewhat

of an unknown quantity, but has become more prevalent in recent years. It is becoming an increasing issue, particularly where continuous spring barley is grown. Lesser canary grass has pale green leaves, typically broader than those of brome or black grass. Lesser canary grass has folded leaves and no auricles.

Strikingly, these plants can have a distinctive red sap in the root tips. Furthermore, a reddish colouration can also be observed in the base of the stem at the vegetative stage of lesser canary grass.

The lesser canary grass seed spikelet has a distinctive tufted shape and can easily be seen bobbing and weaving above the crop canopy after reaching maturity.

Identifying wild oats

Wild oats are a tall, stout, annual tufted grass very similar to cultivated oats. Wild oat leaves are broad, flat and rough and have a distinctive anti-clockwise twist in the leaf when viewed from above. The leaf margins are hairy towards the base and some plants will have hairy stems. It is

also notable by its lack of auricles and the presence of a medium to long rounded ligule.

Identification between the winter and spring species of wild oats is very difficult at the vegetative stage. The main differences being the stouter appearance of the winter species, which can also grow up to 1.8m tall compared with 1.5m in the spring germinating species.

Once the panicle has emerged, there are two features which make it possible to identify between the two species.

- Presence or absence of an awn on the third seed in the spikelet; and
- Whether seeds remain attached to each other or separate at shedding.

In winter germinating species, the awn will be absent from the third seed (and fourth seed if present), also the seeds will remain attached to each other and shed as a unit from the spikelet.

Spring germinating wild oat species will have awns present on the third seed within the spikelet and seeds will separate when mature and are shed singly.



Making the most of your arable area

Optimising use of land throughout the year is what Michael and Stephen Donnelly are doing on their Co Wexford farm. Spring malting barley has earned its place in their rotation

Larry Murphy, Teagasc tillage advisor, **Eoin Lyons**, Teagasc/Boortmalt joint programme advisor, Enniscorthy

Michael and Stephen are innovators, regularly evaluating their crop mix and rotation. Expert growers, they currently have crops of winter barley, spring malting barley, maize, fodder beet and grass. The maize, beet and malt barley are all grown on contract and the area sown is always determined in consultation with the end users and rotational restrictions.

"It is vital in the current climate to

maximise your return per hectare," says Michael. "Our winter cereals go hand in hand with early sowing of fodder crops. The maize and beet allow me the rotations to do so and finishing hoggets provides a source of income at a time of year when there is little or no cashflow from cereals."

The store lamb finishing enterprise developed as a result of land being available over the autumn and winter months. To utilise this land fully, forage crops are grown after harvesting cereals. Lambs are purchased from July onwards and held on grass until the fodder crops become available.

Growing a mix of crops requires a high level of knowledge and management. Timeliness of operations is very important.

Cattle slurry is imported and applied to the maize area to reduce fertiliser costs. Winter barley or winter wheat follows the maize crop. Michael is a member of the New Ross Tillers tillage discussion group.

The winter barley variety Belfry was planted following a crop of maize

last autumn and when it's harvested, fodder rape will be direct-drilled into the stubble.

"Early sowing is vital when growing fodder crops," says Michael. "When it comes to beet, purchasers demand a high dry matter beet and Magnum was planted in early April."

Malting barley is a key component and, again, Michael carefully manages both the production and marketing of the crop. This year, his enviable crop establishment partly results from an extra stone of seed/acre which he felt was needed this season. He avails of opportunities to sell part of his crop forward.

"Some people might ask why so many crops are grown on a small-scale family farm," says Mick. "But if we only planted spring barley, the land is effectively unproductive for seven months of the year. I enjoy a challenge and am eager to find new opportunities to help the business remain viable far into the future."

Boortmalt Joint Programme

The malting barley sector is extremely important to Irish tillage farmers, as it allows growers access to a premium market for their grain. Understanding the importance of the sector, Teagasc, in conjunction with Boortmalt, the largest maltsters in Ireland, have devised a joint malting barley development programme to run for three years. The programme has four specific aims:

- **Make malting barley the most profitable cereal crop in Ireland.**
- **Deliver more brewing and distilling barley within specifications.**
- **Establish a targeted knowledge transfer programme specifically aimed at malting barley growers.**
- **Increase the use of accurate nutrient management planning for malting barley crops.**

Over the course of the three-year programme, malting barley growers can expect to see an increased information flow with regard to malting barley production and technical support for malting barley through crop walks and on-farm workshops.

Monitor farms

The main focus of the programme will be the five malting barley monitor farms, which are located in each of the main malting barley growing regions in the southeast. These monitor farms will be used for specific malting barley crop demos and also to examine all aspects of malting barley crop production, from cultivation practices to financial planning. These farms will be used for both the crop walks and workshops that will be carried out as part of the programme.

Achieving protein specs

Attention to detail is vital when producing quality malting barley crops. The difference between a high-protein and low-protein malting barley can be outside a grower's control; namely the weather conditions during the growing season. However, it also hinges on key crop management techniques that growers carry out both before and during the growing season.

To date, the aim with the malting barley monitor farmers is to focus on crop and input planning. The first step is choosing the correct fields for both distilling and brewing barley. This must take into account previous experience with regard to protein in each field and furthermore soil type, rotation, previous crop offtakes, etc. Optimising P, K and lime inputs are crucial to crop growth and nitrogen utilisation.

Unlike most years, the spring barley seed being sown for malting this year had large variations in thousand grain weight (TGW). This meant that accurately calculating the required seeding rate for the seed being sown was

critical to ensure that the target of 350 seeds per metre squared was drilled.

To calculate percentage establishment of the crop, plant counts had to be taken shortly after emergence. Plant counts are generally good this year due to excellent seedbeds and favourable weather conditions at sowing. The target for spring malting crops is to achieve 300 plants per metre squared from 350 seeds sown and this will give 85% establishment.

Nitrogen rate and timing have the largest impact with regard to grain protein content. Teagasc research has shown that 150kg N/ha is optimum to achieve brewing grade barley, while 130kg N/ha is optimum to achieve distilling grade barley.

Total nitrogen application should be divided between 30% at sowing with the compound fertiliser and the remainder at the one- to two-leaf stage of crop growth. However, this year possess a new challenge in relation to nitrogen

applications. Poorly yielding crops last harvest meant that crop offtakes were low and the potential for excess nitrogen to be reaming in soil is a possibility.

This, coupled with the excellent growth of catch crops, means that a carry-over of nitrogen for this year's crop is a real possibility. It is extremely difficult to quantify how much nitrogen remains in the soil. However, a reduction of between 10kg and 20kg N/ha was made, depending on the level of risk involved.

While nitrogen rate and timing remains the major factor in relation to protein management, the other minor factors must be accounted for to effectively manage protein levels. The external factors of both rainfall level and temperature will always be out of the growers' control. However, if attention to detail is applied to all management decisions, then the potential to meet required specifications will certainly be increased.



Michael Donnelly, Larry Murphy, and Eoin Lyons discuss nitrogen fertiliser.



Helping you to help the environment

The new Agricultural Sustainability Support and Advisory Programme (ASSAP)

Noel Meehan
Programme manager ASSAP



Ireland has been set a target of achieving good status for all waters by the EU Water Framework Directive. Despite good work over the last 20 to 30 years, we are falling short

of this target and water quality has actually declined slightly over the last few years.

ASSAP is a new free advisory service with 20 advisors from Teagasc and 10 advisors from the dairy industry working in 190 catchments or priority areas for action (PAAs) across the country. It is designed to work closely with the farming community to assess farms for any potential issues that may be having an effect on the water quality in local streams. Farmer participation is voluntary.

Where any issues are identified, a plan to put in place mitigation actions designed to “break the pathway” and prevent nutrients from entering wa-

ter will be prepared in collaboration with the farmer. In most cases, these actions will aim to capture the diffuse loss of nutrients to water. This is where nutrients (nitrogen and phosphorus) are leached to water from fields/farms and impact on water at a catchment level.

How does diffuse phosphorus (P) loss occur?

Phosphorus (P) loss typically occurs on soils that have low permeability. These are heavy, poorly draining soils that have high clay content and get quickly saturated with rainfall. When there is heavy rainfall on these saturated soils, this leads to the water staying on the surface of the soil. This in turn leads to overland flow of water, particularly on fields with slopes.

Water flowing across fields brings with it P available to plants in soluble form from applied fertiliser. It also washes off soil particles that have P attached to them. P binds tightly to soil particles. The soluble P and soil particles can then be washed into drains and streams and end up impacting on water quality.

ASSAP advisors will advise measures to alleviate the problem such as grass buffers, riparian margins, hedges and trees, catch crops and contour ploughing.



How does diffuse nitrogen (N) loss occur?

Nitrogen (N) loss typically occurs on soils that have high permeability. These are light, free-draining soils with a high sand content. Water permeates quickly through these soils. Where nitrogen fertiliser above the crop requirement is applied, the N is not utilised and is left in the soil. Nitrogen in the soil is also naturally released through mineralisation, particularly in autumn. Unlike phosphorus, nitrogen does not bind tightly to soil. When there is heavy rainfall, the water leaches N away to groundwater, streams and rivers.

ASSAP advisors will identify areas on farm where this could occur and advise measures to prevent N leaching into ground water, streams and rivers. Careful management of nutrient use is required in susceptible areas. N losses can be minimised by using the correct N fertiliser, (protected urea) at suitable application rates, in suitable fields and at correct times. Tillage farmers can

help further by sowing catch/cover crops to avoid the soil lying bare in autumn/winter.

“ Careful management of nutrient use is required in susceptible areas. N losses can be minimised by using the correct N fertiliser

It is in everyone's interest to work together to improve Ireland's overall water quality. This will have many benefits across the local community and will help with achieving Ireland's obligations under the Water Framework Directive. It will also help to strengthen agriculture by reinforcing our green image as food producers and underpin the future development of sustainable Irish agriculture.



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Sustainable dairy farming

John J McNamara
Teagasc Clonakilty

“My attitude to environmentally friendly farming methods has evolved over the years,” says Cormac O’Keeffe (pictured right). “I rejected the REPS scheme because I felt it would restrict my farming, but since then I have become more aware of the importance of sustainable farming through my own reading and the Carbery Green Dairy Programme.”

Cormac and his wife Clodagh farm at Courleigh, Clonakilty, in west Cork with their children James, Laoise and Eoghan. They milked 128 cows in 2018. Cormac has been a member of the Carbery Green Dairy farmer group since it was started in 2010 by Sinead Treanor of Carbery. He’s also a member of the Clonakilty discussion group facilitated by his Teagasc advisor Mark Treacy.

In 2018, Cormac completed a diploma in environmental science and social policy in UCC. He puts theory into practice and started planting native species hedgerows in 2011.

“At the start, I planted them beside the fence wire and did not protect them from stock. The cows loved to prune the soft new growth of the whitethorns. I changed to fencing either side of the saplings until they had established themselves well.

“You have to prune back the whitethorn saplings hard in their first few years.

This goes against one’s instinct when they are so small, but it does lead to sturdier, denser, hedges, as there will be lots of side branches close to the ground.

“I have a small wood which has sycamore trees and these produce an abundance of free saplings which I transplant into the new hedge rows each autumn.”

Cormac has left a corner of the farm, which he always had his eye on to drain, untouched. He says John Finn of Teagasc was the instigator.

“John said at an event which I attended ‘think twice before you go reclaiming the difficult area; is it really worth all the cost of making it productive? Especially when it can



add so much to the biodiversity on your farm by leaving it and protecting it’.

“It is a low-lying piece with poor outfall. I left it alone and now there are ducks and other wildlife on the small pond. Not having it in grass for a few months of the year is a small sacrifice.

“I stopped spraying under the wires around ditches a number of years ago,” says Cormac. “I did not like the sterile look that resulted. I drop the wires and get a hedge cutter in to trim the ditches as required.

“I am looking at moving the fence wire back from these ditches so that the cows can still graze right up to

the ditch, but it will make trimming the ditch with the hedge cutter easier. I changed fences too and have a fence that will burn any vegetation that comes in contact with it and therefore not loose shock by getting earthed.

“There is no conflict between profitable farming and taking care of the environment for future generations,” he concludes.

“We can’t wait for others to take action. We have to do it ourselves and every little bit counts.”

Dairy performance figures 2018

Average cows	128
Litres produced/cow	6624
Fat %	4.22%
Protein %	3.70%
Kg/milk solids/cow	511kg
Six-week calving	86%
Farm stocking rate	2.61 LU/ha



Putting back in what you take off

William Burchill,
Teagasc/Dairygold Joint
Programme Facilitator,
Teagasc Moorepark



During periods of high grass growth rates, removing surplus grass as baled silage will help to keep good-quality grass in front of livestock and make some valuable reserves of good-quality silage.

When cutting a paddock for surplus baled silage, it is important to consider the amount of nutrients we are removing in the silage from this paddock. A typical bale of silage weighing 800kg fresh (200kg dry matter) contains 10 units of nitrogen (N), 1.6 units of phosphorus (P) and 10 units of potash (K).

Depending on the amount of bales/acre that are harvested, the amount of N, P and K removed can be substantial (Table 1).

In general, the N removed in the bales is not a problem, as N fertiliser will have been applied before cutting and applied again after cutting for the next grazing.

The P and K removed is what needs to be considered. For example, four to five bales/acre will remove around six to eight units of P/ac and 40 to 50 units of K/ac. This is important, as a rough rule of thumb is that 50 units

Table 1: Units of N, P and K removed per acre depending on number of bales per acre

Pre-cutting yield kg/dry matter/ha	Bales/acre	N units/acre	P units/acre	K units/acre
1,500	3	30	4.8	30
2,000	4	40	6.4	40
2,500	5	50	8	50

Table 2: Units of N, P and K applied per acre in slurry depending on slurry thickness and application rate

Slurry application rate	Dairy cow slurry			Thick slatted unit slurry		
	N	P	K	N	P	K
1,500 gal/acre	9	4.5	32	16	9	54
2,000 gal/acre	12	6	42	22	12	72
2,500 gal/acre	15	7.5	53	28	15	90
3,000 gal/acre	18	9	63	33	18	108

K/ac is enough to change a soil K index, ie to go from index 2 to index 3 or vice versa.

If no slurry and only straight N, such as CAN or protected urea, was applied before and after cutting the surplus bales, there will be a large shortage of P and K in this paddock.

Replenished

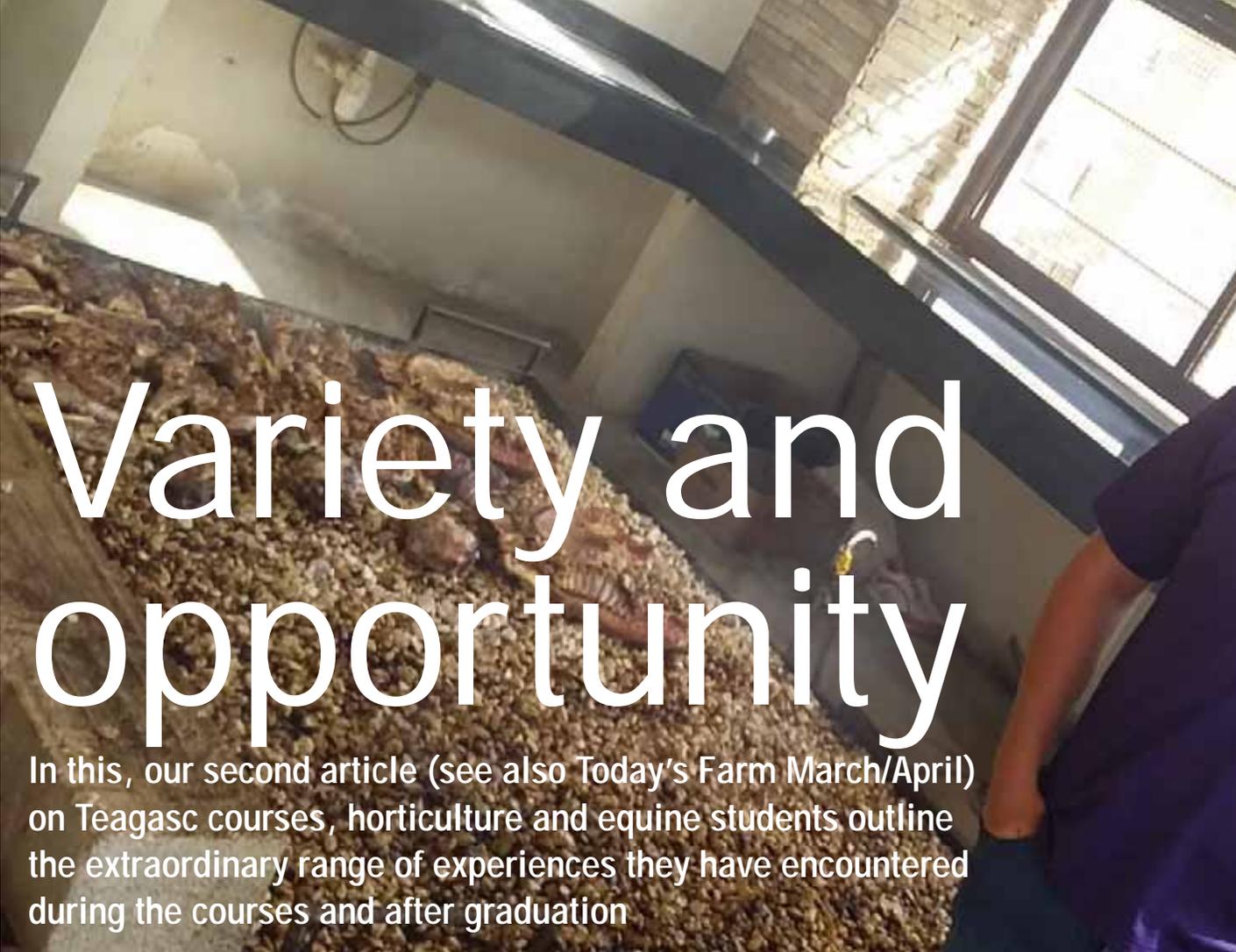
Farmers have found soil K indices to be low on individual paddocks on the milking platform where a lot of surplus bales are removed and K is not replenished.

Best practice is to apply slurry to these paddocks after cutting to put

back what was taken off. The slurry application rates and slurry thickness in Table 2 can be used as a guide.

Where slurry is not available, a P and K compound could be used, but you must ensure you have a P allowance before you spread P. Where you have no P allowance and no slurry is available to spread on these paddocks, a compound such as 19:0:15 is an option.

When making a choice to select one paddock among three or four paddocks to take out for bales, some farmers are selecting the paddock with the highest K index when everything else is equal.



Variety and opportunity

In this, our second article (see also Today's Farm March/April) on Teagasc courses, horticulture and equine students outline the extraordinary range of experiences they have encountered during the courses and after graduation

The Bachelor of Science in Horticulture level 7 at Waterford Institute of Technology/Teagasc Kildalton is very diverse and opens many doors. Some of my class mates look after the gardens in a castle, another is working on Donald Trump's course near Doonbeg, another is working on the stunning new Adare Manor Golf Course and another is working in a well-known garden centre."

So says Shane Burke, who is currently senior maintenance groundsman with SIS Pitches in the United Arab Emirates (UAE). Shane is in charge of 80% of football clubs' stadium and training pitches in the Arabian Gulf League, and school pitches also.

"My typical week consists of driving around the UAE (Abu Dhabi, Hatta, Al Ain, Sharjah and Ajman) liaising with staff making sure the football pitches are up the highest possible standard and that the maintenance plan is being followed closely. I also meet with clients and customers all around the Middle East, including Qa-

tar, Saudi Arabia, Oman, Israel and Egypt. Every day has been different since I started 17 months ago. I have been lucky to be involved in major football tournaments including the FIFA Club World Cup, which was held in the UAE in 2017 and 2018."

BSc in horticulture

"I really liked the diversity of the course, as it was not all about study. I enjoyed the practical side of things in Teagasc Kildalton College; you got hands-on experience of machinery and also planting, etc. There was a lot of variety.

"I was fortunate to get my work experience in Croke Park stadium. My day-to-day duties included the preparation of the pitch for league and championship games and maintaining machinery.

"On match day, I was liaising with divoters, coaching staff of teams, instructing them where to do their warm-ups and also liaising with stewards and officials.

"Also, I was learning about fertiliser and chemicals and application rates. I

Shane Burke of SIS Pitches.



Zack Meehan and Bartek Wojcik pictured at the student garden building project which is under construction at the Teagasc campus in Ashtown Dublin 15.

was very lucky to gain experience in a world class stadium and pitch."

Benefits of the course

"There are so many subjects included that help in everyday life, computer skills, communications even accounting. In the position I am working in now, communication is key, especially when I'm dealing with different nationalities every day.

"Subjects like plant biology, which give you a vital insight into how plant systems work, are also fundamental. You have to understand the soil, the grass and need to know what the problems with the plant are. You also need to know when to apply chemicals, fertilisers and what is best for the plant given the conditions currently and in the future weeks.

"Our next major project is the 2022 World Cup in Qatar. We have just finished building 30 training pitches there now and hope to get some of the stadiums for the tournament also, so that will certainly be interesting and a challenge I'm looking forward to.

"There's opportunity all over the

world for horticulture students, not just in turfgrass, but landscaping and other areas too. Highly qualified skilled people are hard to find now in the industry and there is a big demand for them."

Current students

Zack Meehan is studying for a degree in horticulture at the Teagasc College at the National Botanic Gardens. He is part of a first-year class of 18 students taking their degree, which, again, is run in conjunction with Waterford Institute of Technology.

The students complete three years in their degree, six semesters in total, one of which is a full work experience semester which can be conducted in Ireland or abroad.

The degree is based entirely in the Teagasc College, which is bi-located between National Botanic Gardens and Teagasc Ashtown in Dublin.

"My course is going well and I have learnt a lot already," says Zack. "We attend for work experience on one day per week in Teagasc Ashtown as part of our practical work experience on

the course. We fill out a diary to help gain the most from this experience.

"I am doing six subjects this semester. These include plant knowledge, plant propagation, horticultural mechanisation, horticultural building construction, horticultural skills training and chemistry for land scientists.

"Exams are completed at the end of each semester and you move on to new subjects in the following semester. Each semester is 12 weeks of teaching, so the time is very short. Horticultural building construction is my favourite subject.

"My great-great-grandfather had a nursery in Kimmage called Irish Nurseries. My grandfather worked with the queen on her gardens and, at present, I work alongside my father in his tree surgery business when not at college.

"I find that the course is giving me the tools to help build up my skills which will help me be part of the family business. The level 7 course is full on, but you learn so much from it."

Equine opportunities

Andrew Moore, student on the Level 5 stud management course at Teagasc Kildalton, says: "My family own a small but growing stud farm mainly breeding thoroughbred flat horses. We started off with one foundation mare called City of Cities, we now have 20 breeding mares.

"I always knew I would end up doing horses," says Andrew. "I was young finishing school and was advised by my guidance councillor that the course at Teagasc Kildalton was really practical, with opportunities to grow, learn and mature. It also gave me the opportunity to complete the Green Cert.

"I am enjoying the course and have made friends with other young people who have similar interests. It has introduced me to a new side of the equine industry as I had had very little contact with sport horses before I came here.

"I also enjoy the work experience – this has given me an insight into how high-profile studs do things. At present I am in Ballylinch Stud and I really like the variety that a big yard has to offer and the learning opportunities. From Adrian Sherry, who manages Ballylinch, to the general yard staff, everyone is there to help and educate you.

"I would recommend Kildalton to any young person, either the horsemanship course or the stud management course. They offer great training in the basic husbandry of horses and my course has taught me a lot. The practical skill training is second to none and the environment helps students to learn.

"I would like to travel and there are so many opportunities for young people once they are qualified in stud work. I think it is important to see as much of the world as possible and to see how things are done in other countries.

"I also feel that to get to the top, you have to make contacts and prove yourself outside your comfort zone. I hope to go to spend a breeding season in Australia and see where it takes me from there. Ultimately, when I've seen a bit of the world, I hope to come home and apply what I've learned on our own farm."



Interested in a Teagasc full-time course?

Agriculture courses

Six colleges provide full-time Level 5 and 6 agricultural courses: Teagasc Ballyhaise, Co Cavan; Teagasc Clo-nakilty, Co Cork; Teagasc Kildalton, Co Kilkenny; Gurteen, Co Tipperary; Mountbellew Co, Galway; and Salesian Pallaskenry, Co Limerick.

Horticulture courses

Level 5 and 6 full-time horticultural courses are provided at the Teagasc College of Amenity Horticulture, National Botanic Gardens, Dublin, and Teagasc Kildalton, Co Kilkenny. Both colleges have substantial horticultural facilities and extensive industry links with a hands-on teaching and learning experience delivered by specialised horticultural staff. Accredited and non-accredited short courses and industry continuous professional development events are also offered. Waterford Institute of Technology degree programmes are also delivered at both colleges providing progression opportunities for learners.

Application details for Teagasc full-time Level 5 courses

Equine: Sunday 2nd June 2019

Agriculture: Sunday 30th June 2019

Forestry: Sunday 30th June 2019

Horticulture: Sunday 11th August 2019

How to apply: Apply online at: <https://www.teagasc.ie/education/going-to-college/apply-online/>

For course information go to: <https://www.teagasc.ie/education/>

Equine

Full-time Level 5 and 6 equine programmes are offered at Teagasc Kildalton, Co Kilkenny. Kildalton is a nationally recognised equine training centre offering courses in stud management and horsemanship.

Kildalton's facilities include an equine yard and stables, two outdoor riding arenas and a substantial indoor arena. The college has extensive links with industry and its specialised equine staff provide a very hands-on teaching and learning experience.

Forestry

Full-time Level 5 and 6 forestry programmes are offered at Teagasc Ballyhaise, Co Cavan, which is a recognised forestry education and training centre for the sector. Ballyhaise College has its own woodland and wide range of forestry equipment, including a state-of-the-art forestry training simulator for practical forestry instruction. The course incorporates practical learning periods with host forestry sector companies and contractors. The courses are delivered by specialised forestry staff.

Bright future for on-farm renewables

Wind, solar, biomass and aerobic digestion are all showing promise as sources of energy, and income, for farmers

Barry Caslin
Energy & Rural Development Specialist, Teagasc Rural Economy Development Programme.



The world of renewable energy in the agricultural sector is an exciting place to be. Many farmers will be drawn to on-farm renewable energy projects by the prospect of attractive returns on investment, boosted by the long-awaited Support Scheme for Renewable Heat (SSRH) and the Renewable Electricity Support Scheme (RESS).

Greater scope for anaerobic digestion

The removal of carbon dioxide from energy sources is commonly referred to as decarbonisation. There have been dramatic falls in the cost of technologies such as photo voltaic solar, onshore and offshore wind. Together with battery storage they will help decarbonise Ireland's electricity supply and will generate interest in renewable energy production on-farm.

Large amounts of low-carbon gas will be required to displace fossil fuel natural gas. This will offer opportunities for farmers to produce biomethane through anaerobic digestion (biogas) from slurry and grass, together with other carbon sources such as food wastes.

Biomethane will require SSRH support in order for it to become viable as there is a high capital outlay.

Support Scheme for Renewable Heat

The Minister for Communications Climate Action and Environment (DCCA) Richard Bruton, TD, has committed to introducing a scheme called the Sustainable Scheme for Renewable Heat, which will encourage the installation of equipment such as biomass boilers in commercial prop-



erties which could have a real benefit for rural businesses. The tariff will be paid for 15 years from joining the scheme, providing claimants demonstrate a use for the heat produced.

Many farms have a ready supply of wood coppice, chip or straw that can be used in biomass boilers, and others may be able to use ground-source heat. There could also be scope for individuals or groups to supply heat to local communities through district heating networks.

Renewable Electricity Support Scheme

A new Renewable Electricity Support Scheme will incentivise the introduction of sufficient renewable electricity generation to help meet national and EU-wide renewable energy and electricity decarbonisation targets.

RESS will consist of a number of key elements under headings including: community participation; increasing technology diversity; delivering on renewable targets for 2020 and 2030; and renewable electricity auctions.

Battery storage

The wind does not always blow or the sun does not always shine when you need the electricity. Battery technology could help overcome these peaks and troughs. It also opens up a range of future diversification opportunities, such as the prospect of hosting charging stations for electric vehicles (EVs) on farm.

Low-emission vehicles

Ireland is gearing up to ban the sale of new petrol and diesel cars by 2040. Electric tractors may be on sale as early as 2020, competing with biomethane-powered machinery for farm self-sufficiency, although challenging for the rural energy infrastructure in terms of charging needs.

But large vehicles may function like mobile storage batteries, earning income through so called vehicle-to grid services, potentially allowing access to ultra low cost charging.

Future of renewables

A lot of supermarkets and buyers are looking to supply chain efficiencies and certainly some of the milk buyers are looking to farmers to install renewables.

Milk producers and niche vegetable growers in particular are increasingly being told they need to have good green energy credentials.

The farm of the future has the potential to become an important source of renewable fuel and energy, as well as food. One vision could be the farm as the centre of the local community, supplying energy to their neighbours sourced from solar photovoltaic, wind or bioenergy produced on the farm.

The energy farm might also serve as a local rural vehicle refuelling station delivering renewable fuels. Renewable energy has a key role to play in Ireland's rural economy.

Slurry storage on dairy farms

TOM FALLON

Farm Buildings & Infrastructure Specialist, Teagasc Rural Economy Development Programme.



The majority of farmers store slurry in concrete tanks, typically either indoor slatted tanks or open, outdoor, concrete tanks. As cow houses get bigger it becomes ever more challenging to manage slurry. Automatic scrapers need to deposit slurry at regular intervals into tanks or channels; long or deep tanks can be difficult to agitate.

Farmers developing a new dairy unit on a green-field site can look at alternatives. They might consider lined lagoons and over-ground steel tanks. The relative cost of all four options is shown in Chart 1.

The storage capacity required is calculated at 16 weeks (Nitrate Zone A), and adding a buffer of 20% (6.3m³ per cow). The required storage period is higher for other Nitrate Zones at between 18 to 22 weeks. The cost of any reception tanks is not included for the lined lagoon or steel tank.

The cost of the storage systems is similar with the exception that the lined lagoon is cheaper. The cost of the open concrete tank includes fencing and agitation platforms. Half a meter of rainfall is assumed. On some sites with high water tables the only viable option maybe a fully, or partially, over ground tank.

Lined lagoon storage

This is the lowest cost storage available. It really doesn't make sense to install a small lagoon so the cost of the lagoon is for a net storage of 1,277 m³ or 70% more than the other storage systems.

Lagoons can work well where high volumes of liquid can be spread on dry ground with an umbilical system within reach of the storage facility. Some local planning authorities will not give planning permission for lined lagoons. Safety is an absolute priority with all systems of slurry storage but special care is needed with the lined lagoon.

This should include the provision of numerous 'tyre ladders' (where tyres are bolted together and bolted to the fence posts with a galvanised steel chain or rope) in the lagoon and a weed barrier of concrete or a plastic membrane underneath the fence and on any clay inside the fence. The lat-

Chart 1: cost of slurry storage options for a 116 cow herd

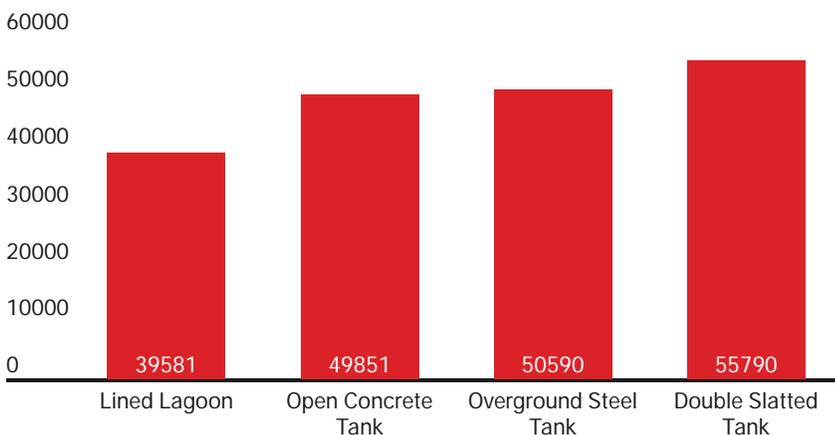
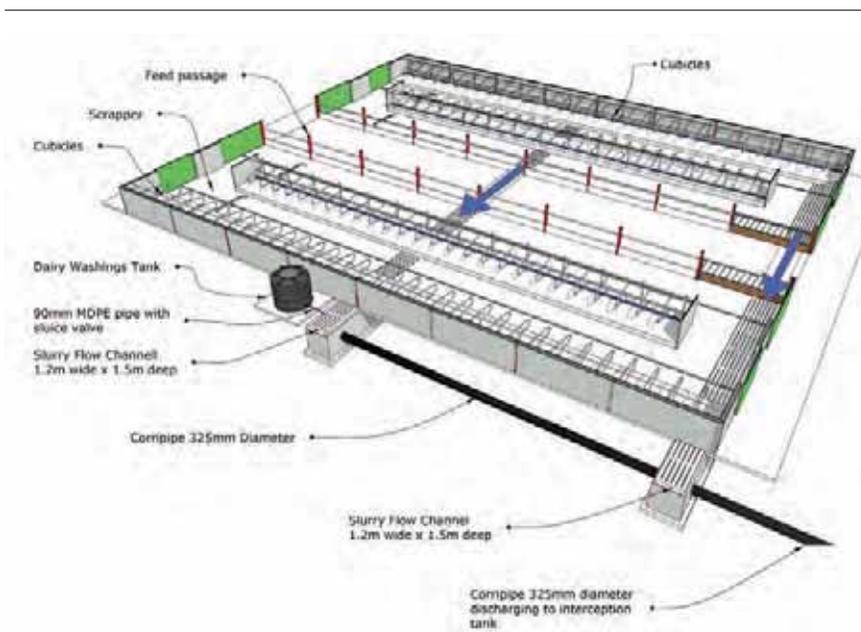
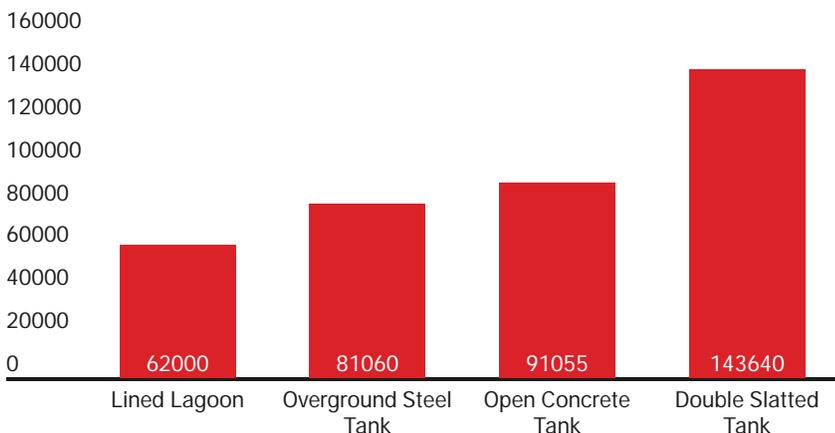


Chart 2: cost of slurry storage options for a 300 cow herd



John Walsh and Eddie Walsh at Teagasc Kildalton use a trailing shoe spreader to reduce gaseous emissions.



ter will remove the need to go inside the fence except at the designated agitation points.

Slurry storage options for a large herd
Chart 2 shows the cost of the different storage options for a large herd. Each option includes parlour washings, except the double slatted tank option, and there is 53% extra storage in the lined lagoon. There is now a noticeable difference between the cost of each of the storage options.

Excavation in particular, but also the provision of a protective fence and safe agitation points, significantly add to the cost of the open concrete tank and lined lagoon. It is assumed that there are no economies of scale in choosing the 'double slatted tank'

option.

There is also the challenge and cost of collecting and transferring the slurry to the storage system. A suggestion of how this could be achieved without incurring excessive cost is shown in Figure 1. Here it is envisaged that washings from the milking machine and bulk milk tank will be pumped to a header tank. This will be used to flush slurry down the pipe system to the storage facility or a reception tank.

Farmers have had trouble with flow channels. Cows on low DMD silage,



or if there is a high level of maize in the diet, will have dung that won't flow anywhere. More research and visits to similar designs abroad is needed.

A farmer developing a green field dairy operation could install a large slurry store at the start and add modules of the cubicle accommodation shown in Figure 1 over time. The extra storage capacity would give options like working with roofless cubicles for a period and perhaps renting out spare storage capacity to neighbours

Ammonia and other gas losses from slurry

The extent of ammonia losses during slurry storage can be experienced by simply visiting a poorly ventilated slatted shed. There is, however, little scope to reduce gas losses from slatted tanks.

Comfort Slat Mats have a system to reduce ammonia emissions that's approved in the Netherlands. In a dairy unit the tank could be largely slatted with slats at intervals to take slurry from an automatic scraper system.

Further development of robotic technology may facilitate this in the future. This might, however, increase the risk of inhaling slurry fumes and there is also the concern that ammonia is flammable.

Covering over ground steel tanks is not recommended since it adds about 66% to the cost and the trapped gases would corrode the steel. Covering a lined lagoon would more than double the cost of the lagoon.

Tips for reducing ammonia losses during storage:

- Have sufficient storage to store parlour washings and slurry together. The washings will dilute the slurry. There is also less nitrogen losses (to the air) from dilute slurry after spreading and it is easier to spread dilute slurry with a trailing shoe etc. Store everything in the one tank but have a 2.1 m wall (in a 2.4 m tank) between the parlour washings section of the tank and slurry store so the former can overflow into the slurry tank from late winter. This assumes animals stand over the parlour washings section during milking only. Parlour washings are separate and can be spread during the early part of the closed period while giving the benefits of mixing outside this period. Parlour washings can also be piped or

pumped to slurry tanks once stock are out in the spring.

- Allow a natural crust to develop in outside tanks to contain gases. The crust can get too thick so it has to be swallowed up in agitation from time to time.
- Propeller agitators mix slurry less aggressively compared to pump agitators so there is less gaseous loss. However, slurry pumps have become very popular in recent years because they can handle big tanks and get the job done fast. In overground tanks and lined lagoons there is scope to use propellers as the main form of agitation as the smooth surfaces facilitate agitation and there is generally less time pressure to complete the job with these facilities.

Fuelling a better future

In Galway, a farmer's timber harvest marks the start of a value supply chain, supporting local jobs, producing renewable wood fuel and reducing carbon emissions

Noel Kennedy
forestry advisor, Teagasc
Crops, Environment
and Land Use Programme



Damien O'Brien and his wife, Carmel, farm sucklers and sheep in Woodlawn, Co Galway. Like most suckler farmers in the west of Ireland, they work hard to make the farm pay its way. Last autumn, a decision taken by



Damien O'Brien in his recently harvested 28 year old Sitka spruce forest.

Damien and his late father – almost three decades earlier – delivered a handsome dividend, giving their farming finances a welcome boost.

In 1991, the O'Briens planted six acres of marginal land with Sitka spruce. "The land was a mixture of rough farming ground and scrub," says Damien. "It was planted by a local contractor, but myself and my father did the fencing – with the grant it cost us nothing to plant."

Last year, concerns about the increasing risk of storm damage combined with strong timber prices prompted Damien to plan the clearfell of the 28-year-old forest.

After getting his felling licence, Damien struck a deal to sell his timber on the basis of a "standing sale" to Ballygar-based Murray Timber and, following their advice, built a small loading bay to facilitate loading timber.

Damien kept a close eye on the harvesting operation and the removal of timber loads. "I erected a timber docket box on the road into the forest – not far from the house," says Damien. "Every lorry going in to take a load of timber put in a docket and so I was able to account for every load that came out. I found Murrays great to deal with and I had a cheque within a few days after each load."

Commercial sawlog and pallet wood went directly into Murrays with stake wood sold to a local fencing mill. The remainder, lower-value pulpwood, was destined for a different and strongly emerging market – the wood energy market. It is the beginning of a local woodchip supply chain supporting farming incomes, local forestry employment and helping to combat climate change.

Damien's clearfell produced over 800 tonnes of timber for which he received €32,000 including an additional 5.4% VAT he was able to claim as a VAT unregistered farmer. "I'm delighted with the return" says Damien. "The forest cost us nothing to plant and I had 20 years of forestry premiums – I'm looking forward now to replanting and hopefully seeing a return from the next crop."

The woodchip producer

Pulpwood from Damien O'Brien's forest didn't have to travel far to



Cyril McNamara, Teagasc, checks a delivery of wood chip for the Atheny boiler with Simon Hyde, Aughrim Sawmills.

market – only a few short miles in fact – to Aughrim Sawmills outside Ballinasloe.

The short haulage distance is a critical factor in the economics of a wood chip supply chain – a point not lost on sawmill manager Anthony Hyde.

"Both pulpwood and wood chip are bulky and expensive to transport," says Anthony. "So the shorter the haulage distance to the sawmill, and then to the customer, the better the economic and environmental savings all round."

Aughrim Sawmills has been commercially run by the Hyde family for over 40 years. Anthony's late father Michael upgraded an old estate sawmill in the 1980s and the business is now operated by himself, his brother David, and son Simon.

Although the main sawmill production caters for a range of niche timber markets using high-end durable Douglas fir and Larch, it also produces and supplies wood chip in response to increasing demand for wood bio-



mass fuelled renewable energy.

With an annual production of 700 tonnes of woodchip, and growing, Aughrim Sawmills is the trusted supplier to several local customers generating renewable heat. It typically uses small- to medium-sized biomass boilers.

Consistent woodchip quality and security of supply are critical to maintaining customer loyalty and trust. Customer confidence in Aughrim Sawmills is reinforced by its accreditation to the Wood Fuel Quality Assurance (WFQA) scheme which certifies suppliers for reliable, high-quality wood fuels. (Further information is available at <https://wfqa.org/>)

The moisture content of delivered wood chip determines heat generation efficiency and customer satisfaction. But it takes time for fresh timber to dry down to a moisture content of 20%, which Anthony believes is ideal for chipping.

Drying can take up to 18 months so,

although harvested six months ago, it will be another while before Damien's timber is ready for chipping and the next stage of the supply chain – delivery to a renewable heat user.

The renewable heat user

One of Aughrim Sawmills' customers is Teagasc and every couple of weeks, less often during summer, Anthony Hyde's son Simon loads seven tonnes of dried wood chip for delivery to the Teagasc Campus in Athenry – the main advisory and research centre for the west of Ireland.

Since 2011, staff and visitors to the campus have been warmed by renewable heat generated by a wood chip biomass boiler. This was installed by Teagasc as a significant initiative in reducing its energy usage and carbon footprint.

A 300kw Herz biomass boiler is at the heart of a mini district heating system. It provides renewable space heating and hot water to a number of

buildings housing 70 permanent staff and many more visiting staff and students. In 2017, heat produced by the biomass boiler was the most important energy source on the campus. It contributed one-third of all energy consumed on the site.

The boiler must stand up to economic and environmental scrutiny – it passes on both counts with flying colours. Based on today's energy costs, renewable heat generation using woodchip is saving Teagasc in the region of €10,000 per annum while displacing over 40,000 litres of oil and reducing CO₂ emissions by 100 tonnes annum.

Forestry in Galway is proving its value to farm forest owners, timber processors and end users. Strong demand and prices for commercial timber are now complemented by a local wood energy supply chain making critical economic and environmental contributions to farming and rural sustainability. Fuelling a better future for all.

Worms: ecosystem engineers

Paul Fitters

Lecturer at the Teagasc
College at the National
Botanic Gardens



In gardens you can find three groups of worms: earthworms, nematodes and flatworms. Most of them are very useful but there are some, new, interlopers who are likely to cause problems.

Earthworms

This first group of worms is familiar to us all. But did you know that there are 26 different species of earthworms in Ireland and each has a distinct habitat? Having earthworms in your garden is good for the soil as they burrow into the ground helping with drainage when it rains and aiding in aeration of the top soil.

Their diet consists of living and dead organic material which they gulp down together with soil. The organic matter is broken down and partly digested inside the worm. That which comes out the other end is further broken down by soil organisms.

Casts (worm poo) are a valuable source of plant nutrition and help stabilise the soil. So earthworms are “ecosystem engineers” enormously important for creating a healthy soil environment for plants.

There can be as many as 800 earthworms per m² in orchard soils, but numbers can be as low as five worms/m² when the soil is regularly cultivated. The high numbers in grassland explain why birds pick out worms of a lawn almost endlessly, without ever running out.

Nematodes

The second group of worms are microscopic in size (0.1mm to 2.5mm). They can be found in all habitats of the world from marine (salt) to fresh water, and in soils, from polar-regions to the tropics. A 2013 survey of animal biodiversity reported over 25,000 nematode species.

The free-living species feed on materials as varied as algae, fungi, small animals, fecal matter, dead organisms, and living tissues and like



earthworms play an important role in the decomposition process and recycling of nutrients.

There are insect parasitic nematodes which kill garden pests such as cutworms and black wine weevils. On the other hand, plant parasitic nematodes, such as the potato-cyst nematode or the root-knot nematode, when not carefully managed, can wipe out crops.

One soil-living nematode, *Caenorhabditis elegans*, received global attention in 1998 when it became the first multicellular organism to have its whole genome sequenced. *C. elegans* made news in 2013 when specimens were discovered to have survived the Space Shuttle Columbia disaster.

Flat-worms

Well-known examples of flatworms are flukes, tapeworms and bilharzia or snail fever, which is the second-most devastating parasitic disease in

tropical countries, behind malaria. In our gardens the only flatworms of significance are the invasive New Zealand flatworm *Arthurdendyus triangulatus* and the Australian flatworm *Australoplana sanguinea*, both of which prey on earthworms.

A. triangulatus is thought to have reached Europe in plant containers. It was first recorded in Belfast in 1963. It is easily transported accidentally in plant pots in adult or egg form and hence tends to be common in garden centres. As their food source is the beneficial earthworm, their presence could degrade soil quality. They are slowly spreading from gardens into agricultural lands.

Want to know more?

If you are interested in hearing more about these fascinating creatures and seeing them on display, I will give a public talk in the visitors' centre in the National Botanic Gardens in Dublin at 3pm on Wednesday 15 May.

TEAGASC DAIRY MANUAL

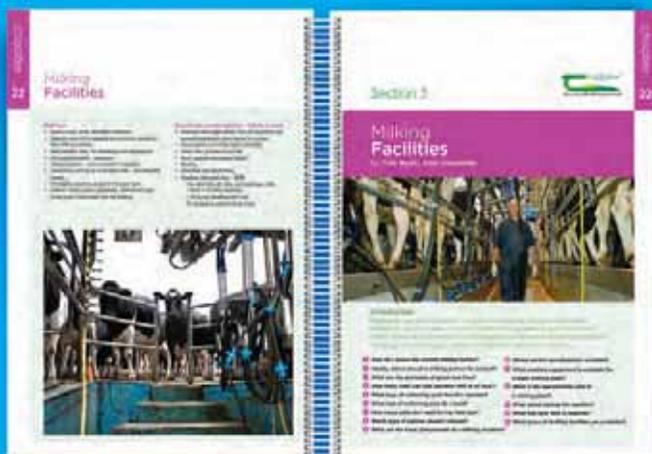
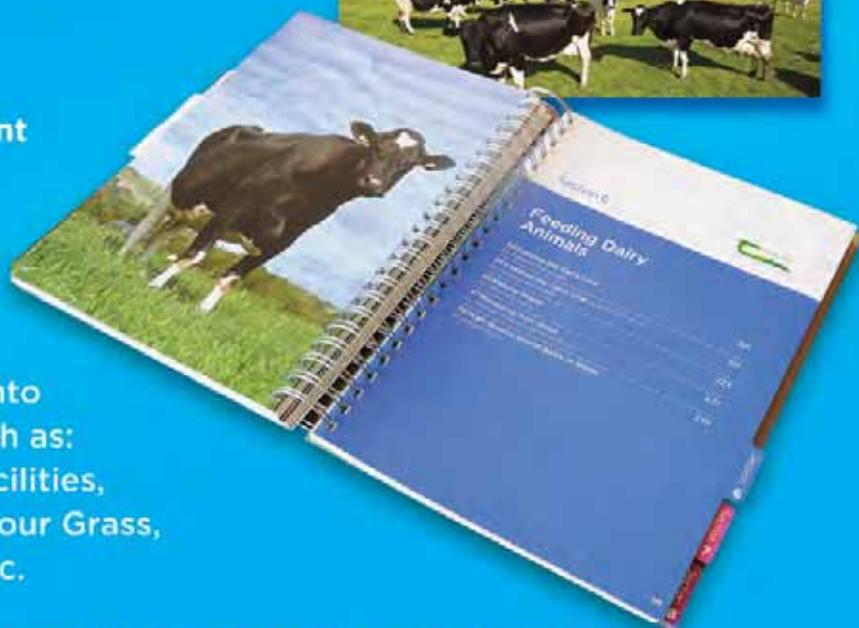
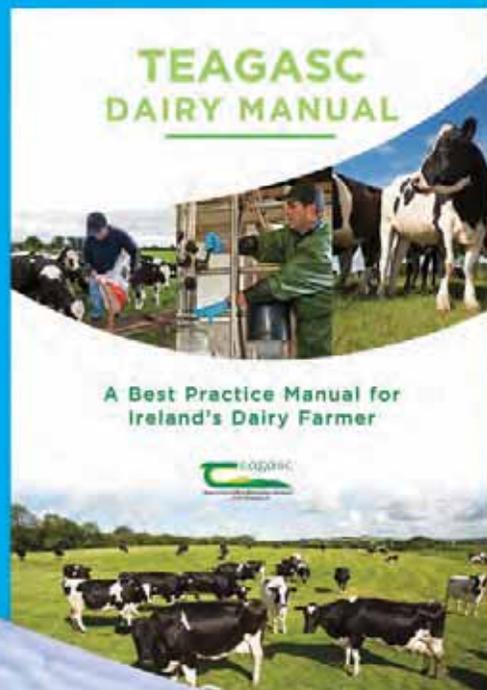
A comprehensive source
of practical advice
for any dairy business.

- Why dairy farming?
- Business management
- Dairy facilities
- Dairy farming and the environment
- Milk quality
- Feeding dairy animals
- Dairy breeding
- Dairy animal health

These sections are further divided into a total of 49 chapters with titles such as: Creating a Business Plan, Winter Facilities, Feeding the Dairy Cow, Managing Your Grass, Replacement Heifer Management etc.

The information within each chapter is built on feedback from farmers and is laid out as Questions and Answers, How-to's, Key Performance Indicators, Key risks, etc. making the Manual extremely easy to read and use. The Manual will be of particular interest to anyone planning to expand over coming years.

A must for anyone with an interest in dairy farming the 310-page Manual is produced using tear-proof, water-proof paper for real world conditions.



The Teagasc Dairy Manual is available from your local Teagasc office (clients €25, non-clients €50). Alternatively contact **Therese Dempsey (059 9183422)** who will send you a copy by post (p&p €7.50 extra)

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[^] *C. perfringens* causes diarrhoea in cattle and sheep

* Where 2 doses are part of a primary vaccination and are administered 4 to 6 weeks apart as recommended by SPC. Tribovax 10 Suspension for injection for cattle and sheep contains *C. chauvoei* whole culture, and the following toxoids: *C. perfringens* type A (α), *C. perfringens* type B & C (β), *C. perfringens* type D (ϵ), *C. novyi*, *C. septicum*, *C. tetani*, *C. sordellii*, *C. haemolyticum*.

Always read the package leaflet or SPC before use.

Prior to first time use on a farm, it is strongly recommended that the advice of a veterinary practitioner is sought.

Withdrawal period: zero days. Legal category: **LM**

Use medicines responsibly.

For further information see SPC, contact prescriber or MSD Animal Health, Red Oak North, South County Business Park, Leopardstown, Dublin 18, Ireland.

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