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www.cattlebreeders.org.uk

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Date for your diary...

The 2021 British Cattle Breeders Club Annual Conference will be held as a Virtual Conference on Tuesday 26th January.

The conference theme 'Our Breeding Goals – Learn from the past to focus on the future' promises to be an inspiring and lively event for beef and dairy cattle breeding, which brings together key speakers from home and abroad.

Message from the 2020 Chairman Clive Brown



I was introduced to the British Cattle Breeders Club in 2003 and it has become an annual fixture in my diary ever since, so I was honoured to be elected as chairman. As an industry we can sometimes be a little hesitant to embrace both change and new technology so with this in mind I decided on a theme for the conference of 'learn from the past to focus on the future'. Little did I know that this would be a year like no other and that we as a club would have to embrace both change and technology, and as such I will be the first BCBC chairman to preside over a virtual conference.

As a bovine sector, we have many challenges but also many opportunities. With a growing global population and affluence comes the desire to consume increasing amounts of protein as well as having higher quality aspirations. However, we also face increasing pressure from challenges to the industry on environmental and dietary health grounds – the challenge is how can we produce more from less, while minimising environmental impact and protecting consumers? This has to be addressed, whilst improving quality and value for an ever more demanding consumer, and we ignore this at our peril.

We have seen over many years how cattle breeding has greatly benefitted from the appliance of science, new technologies, and innovation. In this 'new era' I have no doubt that science and innovation will never have been more important for farmers, both now and for generations to come. New thinking, and strengthen-

ing the ability to innovate, will provide the advances and improvements that will increase efficiencies and produce populations of animals that can respond to the demands of a changing market place. By the nature of cattle breeding new science adopted today may take years to deliver its full reward. So, we have to ask ourselves what science, new technology and innovation can also add value to beef and dairy production in the short and medium term? Also, how do we engage young people, encourage their passion for agriculture and secure their future?

The 2021 BCBC programme has been developed around these points and the fact that we will have a digital conference has given us the opportunity to access more speakers from around the world which means we can catch up with one or two old friends and hear from some new ones. I really do hope we can learn from the past to focus on the future.

Finally, can I thank all of our sponsors for their support, which has enabled us to continue to deliver a conference, and also those who have supported me as we faced an ever-changing world. The committee, particularly my vice chair Karen Wonnacott and Andy Dodd for the numerous Zoom calls but most of all the ever-efficient Heidi Bradbury, our company secretary, who would admit to being on a steep learning curve but has managed to pull everything together as always.

I very much hope that you enjoy the programme and the people, and log out of the 2021 BCBC conference informed, full of ideas, and with the energy and vision to embrace practical innovation and add value to every level of our great beef and dairy industries.

BCBC Conference Preview & Autumn Newsletter 2020



Heidi Bradbury

The British Cattle Breeders Club Conference Goes Virtual for 2021

BCBC annual conference goes virtual in 2021 – Due to the Covid-19 uncertainty the committee have decided to go Virtual for the 2021 Conference. This one-day E-Conference, on Tuesday 26 January, is an exciting change of direction and will open BCBC up to a greater national AND international audience, with presentations available for both the beef and dairy sectors.

BCBC is renowned for delivering the leading conference for both the beef and dairy sectors, which provides

a forum for knowledge exchange between farmers, scientists and industry in a relaxed and friendly way.

The on-line platform will allow delegates to access the various 'rooms' to hear dairy and beef presentations and will provide an exhibition area where delegates can access sponsor information and 'meet' with them as required.

Access to the conference is just £45, which gives unlimited access and full BCBC membership for 2021.

Secretary:

Heidi Bradbury:
British Cattle Breeders Club
Underhill Farm
Glutton Bridge
Earl Sterndale
Buxton
Derbyshire SK17 0RN
Tel: 07966 032079
email: heidi.bradbury@cattlebreeders.org.uk
www.cattlebreeders.org.uk

Grateful thanks go to all of our conference sponsors. The 2021 major sponsors are:



Sponsorship opportunities are still available for the 2021 conference, please contact Heidi for further details.

Dairy Pro Members

The British Cattle Breeders Virtual Conference 2021 is registered with Dairy Pro, the industry's training and development scheme; Dairy Pro points can be gained

from logging on and viewing the conference presentations, don't forget to collect your points after the event by contacting the BCBC secretary or the Dairy Pro office.

The Club is run by an elected committee, with each member appointed for a period of four years. The committee chairman is an annual appointment and he/she guides the development of the conference, so that each year a different theme evolves. The Club, which is both a charity and a company limited by guarantee, is administered by a secretary.

If you would like to get involved, please contact our secretary, Heidi

Bradbury on 07966 032079 or email her at heidi.bradbury@cattlebreeders.org.uk or feel free to speak with one of our committee members. Our AGM will be held 'Virtually' on Tuesday 2nd February 2021 at 2.30pm, if you wish to join us virtually at the AGM please register with the secretary before Monday 11th January 2021 by email, and the secretary will forward the link to join the AGM before Friday 29th January.

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Dr. Frank Mitloehner
Rethinking Methane –
animal Ag's path to Climate
Neutrality



Dr. Alison Van Eenennaam
Genome Editing approaches
to augment cattle breeding
programmes

The programme for the 2021 conference has been announced, here is a snapshot preview of some of our keynote speakers.

Dr. Frank Mitloehner

Department of Animal Science at the University of California

Rethinking Methane – Animal Ag's path to Climate Neutrality

Dr. Frank Mitloehner is Professor and air quality specialist in the Department of Animal Science at the University of California. He shares his knowledge and research, worldwide, with students, scientists, farmers, ranchers, policy makers and the public at large. Franks passion and commitment to understanding and mitigating air emissions from livestock operations is making a difference to future generations. Being Director of the CLEAR Centre with its core values of research and communications, Frank is bringing clarity and understanding of environmental and human health impacts of livestock, helping create informed decisions on the food we eat whilst reducing environmental impacts.

Frank was recruited by UC Davis in 2002, to fill its first-ever position focusing on the relationship between livestock and air quality. Franks talk will be based around this research of 'Rethinking Methane – Animal Agriculture's path to Climate Neutrality'; as animal agriculture is often shouldered with a large part of the blame when it comes to climate change, but that is because we haven't been looking at all greenhouse gases correctly. By rethinking methane, we can show how animal agriculture is on the path to climate neutrality, which will allow the global community to find meaningful solutions to climate change.

Dr. Alison Van Eenennaam

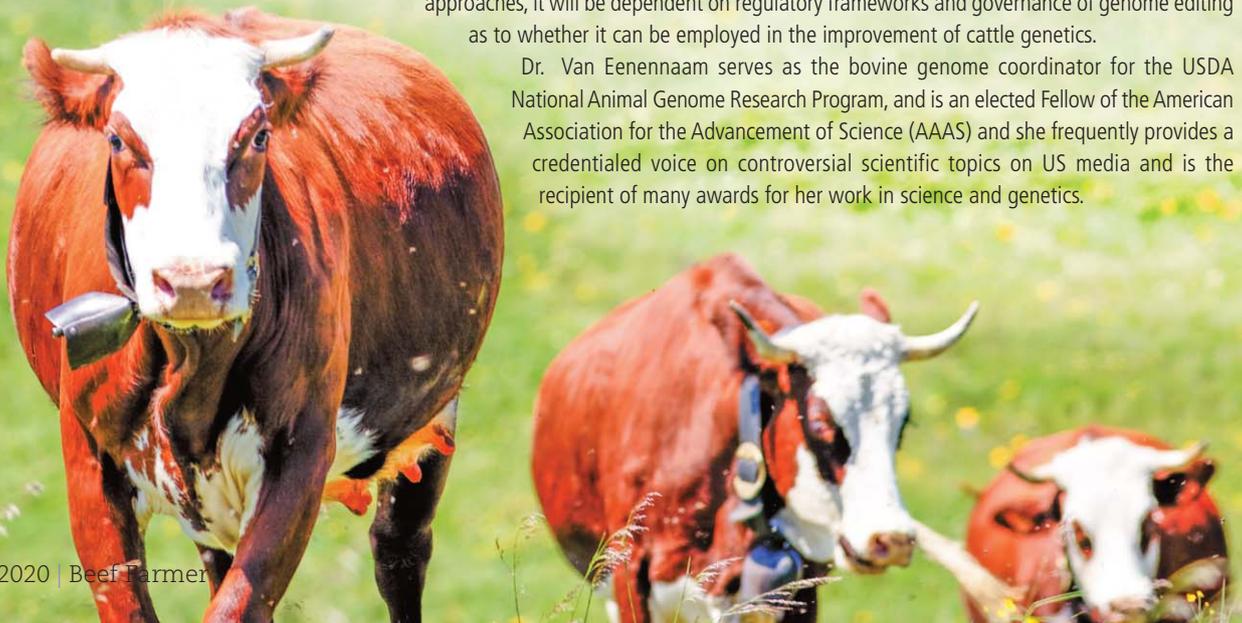
Department of Animal Sciences, University of California

Genome editing approaches to augment cattle breeding programmes

Dr. Alison Van Eenennaam is a Cooperative Extension Specialist in the field of Animal Genomics and Biotechnology in the Department of Animal Science, University of California. Her publicly-funded research and outreach program focus on the use of animal genomics and biotechnology in livestock production system and her current research projects include the development of genome editing approaches for cattle.

Dr. Van Eenennaam will be presenting on her genome editing research in cattle. To date genomics has focused on disease resistance, production, product quality, and welfare traits. However, modelling has revealed how Genome Editing could be used to introduce beneficial alleles into cattle breeds and maintain, or even accelerate, the rate of genetic gain accomplished by conventional breeding programs. However, as with earlier genetic engineering approaches, it will be dependent on regulatory frameworks and governance of genome editing as to whether it can be employed in the improvement of cattle genetics.

Dr. Van Eenennaam serves as the bovine genome coordinator for the USDA National Animal Genome Research Program, and is an elected Fellow of the American Association for the Advancement of Science (AAAS) and she frequently provides a credentialed voice on controversial scientific topics on US media and is the recipient of many awards for her work in science and genetics.



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Tom Gubbins

Te Mania Angus, Victoria, Australia

Beef Genetics – Data Rules the Information Age

Te Mania Angus is an Angus seed stock breeding business, 90 years in the making. Tom left to study Farm Management in New Zealand, then spent 3 years selling agricultural software in Australia and the UK before going back to the family business in 1994. Te Mania Angus currently has 2,000 females in the herd, with bull sales held annually within NSW and Victoria. Bulls are leased out annually as part of the Team Te Mania Progeny Test Programme, which now has 45 herds across SA, Victoria and NSW.

The Te Mania Angus philosophy is to breed sound, highly fertile cattle with calving ease, high growth rates and exceptional carcass quality to enable its clients to meet strict market specifications and optimise profitability.

Te Mania Angus are about progress – genetic progress; and they have been dedicated to collecting data and information since the 1950s.

Technology has fast tracked their ability to integrate the data – within their herd and the extensive progeny testing program they run through the thousands of cows across the country, within Team Te Mania.

Being able to see the data means you can analyse it to produce the desirable package – and that's what they are about at Te Mania, getting the right package with the greatest impact for their client's bottom line. Tom will be packaging all his learning and presenting them to you in his talk 'Beef Genetics – Data Rules the Information Age'.



Tom Gubbins

Beef Genetics – Data Rules the Information Age

Steve Binnie

Owner, Mirannie Station, Mirannie, NSW, Australia

Adapt or Die

The Binnie family have been operating in Australian agriculture since 1835. Based on 7,000 acres of prime cattle breeding country renowned for lush pastures, crystal clear spring fed creeks and natural rye grass or clover pastures in the heart of the Hunter Valley. In 1917 the nucleus Hereford herd, still seen today, was bought. The property has been passed down the generations with improvements to water, infrastructure, pasture and genetics. Steve and Liz Binnie took on this family legacy in 2004, moving solely into Wagyu cattle breeding and direct to restaurant beef sales after live cattle exports were suspended to Indonesia with a loss of A\$320 million to the cattle industry. They saw an opportunity into Wagyu, from investing and selling genetics to producing beef, both of which are sold around the world. They pride themselves on consistency of the beef and this is derived from the starting genetic base, with DNA linked back to Japan, and full traceability of the animal from birth to box!

Steve will be presenting on the Binnie's ability to 'Adapt or Die', ensuring business agility has moved his business forward, with emphasis on how it all starts with genetics to ensure his Delta Wagyu Genetics are hitting growth, functionally and marbling whilst producing mouthwatering steaks, to the world's best restaurants and direct to homes.



Steve Binnie

Adapt or Die



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Prof. Albert De Vries
Profitability and efficiency of
the five-lactation average
dairy cow



Peter Hynes
Embracing Genetics Gain
Amidst Dairy Expansion

Professor Albert De Vries

Department of Animal Sciences, University of Florida

Profitability and efficiency of the five-lactation average dairy cow

Prof. Albert De Vries is Professor at the Department of Animal Sciences, University of Florida, where he teaches undergraduate dairy courses and advises undergraduate & graduate dairy students. His research covers; dairy culling & replacement strategies, statistical process control, economics of reproduction & genetics and precision dairy farming.

Prof De Vries works within the allied dairy industry and dairy farmers on how to apply the results from his dairy management research and farm financial management with special interest in the economic valuation of production changes on dairy farms.

Prof De Vries presentation will highlight the positives for extending the average number of dairy cow lactations to five, which can be accomplished through breeding, cow care and improved decision making. Looking at opportunities and lessons from the past, Prof De Vries will focus on the economics of extending the lactations.

Peter Hynes

Rathard Holsteins, Co. Cork, Ireland

Embracing Genetics Gain Amidst Dairy Expansion

Peter and his wife Paula farm the 180 pedigree Rathard Holsteins herd in Co. Cork, Ireland. EU quota was removed in 2015 and this saw herd expansion from 50 head of cattle; with their main focus on maximising genetic gain. Genetic gain is being by using elite genotyped sires combined with information gathered from genotyping all females within the herd and matching sire traits to the requirements of the herd.

Teamwork is key to how the farm is run and this has led them to working closely with the National Cattle Breeding Centre, and towards fulfilling the requirements of the national dairy herd; which maximises financial returns from surplus stock sales.

Peter and Paula won the 2017 'Zurich Independent Farmer of The Year' and are ambassadors for the Irish Cattle Breeding Federation. Peter is passionate about family farming and this is seen in his contributions to the *Farming Independent* and public speaking roles. Both are ambassadors for the mental health charity, TackleYourFeelings along with helping raise awareness and taking part in projects for other farming charities.



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John Maddux

Maddux Cattle Company, Imperial, Nebraska

British Breeds used on our Ranch

John owns and manages the family ranch which consists of 45,000 acres, 2500 suckler cows and 5000 yearlings, which are grazed on a year-round low-input system. John's aim is for a modest level of production, with emphasis on fitness and convenience over high production traits.

John will be presenting on the use of British cattle breeds on their ranch, which is made up of Red Angus, Tarentaise, Devon, South Devon and Red Poll. John uses this British based composite cow to utilise the low input grazing system. They graze 365 days a year, on a combination of 1/3 Hard land and 2/3 Sandhill's grass with roughly 1000 acres of sub-irrigated meadows. No stored feed is fed and minimal supplementation used, cornstalks, off rented land, are grazed throughout the winter.

Along with the day to day running of the ranch, John is a member of the Nebraska Grazing Lands Association; the Nebraska Investment Council, which manages the state's pension assets; and is a member of the State Bank Board of Directors. Prior to running the ranch, John was employed by Goldman Sachs of New York, and worked with Elanco selling herbicides.



John Maddux

British Breeds used on our Ranch

Sarah Pick, MSc

Nuffield Scholar 2019, AHDB B&L Knowledge Exchange Programme Manager, Warwickshire

Heifer replacement strategies: Cost reduction in the UK suckler herd

Sarah grew up on the family beef farm in Yorkshire breeding pedigree Simmental cattle; this interest in farming saw her obtain a BSc in Animal Management & Science at Askham Bryan College and an MSc in Sustainable Agriculture at Harper Adams University. Sarah joined AHDB in 2015 as a beef specialist and recently moved to the Beef & Lamb Knowledge Exchange Team. 2019 saw Sarah become a Nuffield Farming Scholar, she travelled within the UK and to Australia, Canada and USA, to investigate heifer replacement strategies in the suckler herd, visiting farms with herds from 20 to 42,000 cattle and talking to researchers and farmers.

Sarah will be presenting on her Nuffield Scholarship findings; she learnt that calving heifers for the first time at two years of age is an effective method of reducing cost of production and increasing cow lifetime reproductive performance. However, it is estimated that only 35% of English suckler producers carry out the practice. By understanding the management practices required to ensure calving heifers at two years of age is successful and that a more functional suckler herd is created, Sarah hopes to inspire more farmers to start calving heifers at 2 years of age.



Sarah Pick, MSc

Heifer replacement strategies: Cost reduction in the UK suckler herd



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Rebecca Burnham
Optimising Beef Selection in Northern Australia



Dr. Cath Rees
Use of Actiphage to detect bovine TB and Johne's disease; Achievements and unanswered questions

Rebecca Burnham

Boogal Cattle, Queensland, Australia

Optimising Beef Selection in Northern Australia

Rebecca Burnham is an Australian Beef Producer and International Nuffield Farming Scholar. The Boogalgopal property is situated in the North Burnett area of Queensland. They run a herd of 800 Brahm and Chabray cattle over granite breeding grounds with 3500 acres of scrub used for fattening. The versatility of the country allows the running of a breeding-fattening operation with the turn-off of prime steers for the EU market being the main focus of our family operation. Boogal Cattle Co is an accredited Grasslands Beef Producer. The aim of the business is to breed cattle to thrive in Northern Australia, that are profitable whilst addressing social and environmental signals.

Rebecca is an International Nuffield Farming Scholar and she travelled to 14 countries during 2019 as part of her research to discover how to further optimise her herds genetic progress in traits of importance not recognisable by eye such as; fertility, feed efficiency, yield and eating quality. Rebecca presents her findings to you during her talk on 'Optimising Beef Selection in Northern Australia'

Dr Cath Rees

School of Biosciences, University of Nottingham

Use of Actiphage to detect bovine TB and Johne's disease; Achievements and unanswered questions

Dr. Cath Rees is currently Associate Professor in Microbiology in School of Biosciences, Nottingham University. Originally, she studied Biochemistry at Oxford, followed by a PhD in Bacterial Genetics at Leicester University and has developed a research focus of applying molecular techniques to the study of applied microbiology, with specific interest in the study of *Listeria* and *Mycobacteria*.

Dr. Rees will present her research on Actiphage® which is a new blood test that can be used to detect both bovine TB and Johne's disease. She will review what new information has been gained about these diseases and how using Actiphage can be used for the future management of the diseases. Unlike conventional immunological tests, a positive, Actiphage, result indicates that the animal is currently infected and the type of bacteria present can be confirmed using PCR. Tests can be performed on animals at any age and at any stage of infection, and there is no limit on the interval between tests. However, to get a positive result bacteria have to reach a certain threshold level in the blood.

Research carried out by Dr. Rees, has resulted in the development of rapid, phage-based tests for the detection of mycobacterial pathogens including *M. tuberculosis* in humans and *M. paratuberculosis* and *M.bovis* in animals. This has led to the establishment of PBD Biotech Ltd with Dr. Rees as CSO and winning The Royal Dairy Innovation Award for research and development in dairy farming.

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Dr Mark Young

Head of Innovation, CIEL, York

Resilient & Robust Cattle – Defining a breeding objective

Dr Young has been with CIEL for 4 years as Head of Innovation. Previously he spent 15 years as geneticist with the NZ sheep genetic improvement system, SIL. He has been a scientist with SRUC in Edinburgh using CT scanning to look at the genetics of carcass growth in sheep.

Mark has spent much of the last 25 years working closely with farmers and sees demystifying technology paired with understanding farmer needs, as the key to delivering innovations that are relevant, deliver value and will be widely picked up.

Marks talk is based around his interest in CT scanning, carcass evaluation and genetics to bring you *'Resilient & Robust Cattle – Defining a breeding objective'*.

Farmers in challenging environments know about the advantages of animals that are able to cope with these challenges; such as disease, low levels of feed or extreme weather. This multi-faceted trait (or traits) is receiving increased interest from animal scientists seeking to define key dimensions of these traits, and geneticists who are wanting to predict genetic merit. Mark will be presenting the idea of 'Anti-Fragility' and he will examine how this helps to define the traits.

Mark is actively seeking your feedback during his presentation, so lots of questions and thoughts will be welcomed.



Dr Mark Young

Resilient & Robust Cattle –
Defining a breeding
objective

Why not join BCBC?

Membership is just £45 and offers the following benefits:

- Access to the 2021 Virtual British Cattle Conference
- Access to the last 60 years of conference papers
- The chance to participate in farm walks
- A copy of the magazine, Cattle Breeder, with topical articles and information
- A copy of the Digest (the proceedings of the BCC)



BCBC VIRTUAL CONFERENCE Tuesday 26 January 2021

'Our Breeding Goals – Learn from the Past to Focus on the Future'

The BCBC one day E-Conference will have both beef and dairy presentations running parallel throughout the day, with a virtual 'Beef Room' and a virtual 'Dairy Room', with three presentations shown in the Beef Room but aimed at both sectors (Dr Mark Young, Dr Alison Van Eenennaam and Prof Frank Mitloehner). There is also an exhibition area where delegates can see our sponsors and interact with them.

BEEF ROOM

DAIRY ROOM

09.00	Club Chairman Clive Brown opens the conference for both the Beef and Dairy delegates	
09.05	Tom Gubbins, Te Mania Angus, Australia. Beef Genetics – Data Rules the Information Age	09.05 Peter and Johnny Alvis, Alvis Bros Ltd, Lye Cross Farm, Bristol Matching your cow to your customer
09.35	Stephen Binnie, Binnie Beef Warehouse, Australia. Adapt or Die	09.35 Susie Stannard, AHDB, Warwickshire Shifting consumer attitudes to dairy post-Covid 19
10.05	Rebecca Burnham, Boogal Cattle, Australia. Optimising Beef Selection in Northern Australia	10.05 Will Frost, Childhay Goats, Childhay Manor Farm, Beaminster Working with processors and consumers to maximise returns
11.15	Claire Donoghue, OSI, Germany Challenges & opportunities for the future beef industry; a commercial perspective	11.15 Dr Cath Rees, University of Nottingham, Nottinghamshire Use of Actiphage to detect bovine TB & Johne's disease; achievements and unanswered questions
11.45	Steven Evans, AHDB, Warwickshire Adapting to the changing consumer landscape and maximising future consumer opportunities for the meat industry	11.45 Peter Hynes, Rathard Holsteins, Ireland Embracing Genetic Gain Amidst Dairy Expansion
12.45	Dr Mark Young, CIEL Innovation Centre, York Resilient and robust cattle – Defining a breeding objective	
14.14	Sarah Pick, AHDB B&L & Nuffield Scholar, Warwickshire Heifer replacement strategies; cost reduction in the UK suckler herd	14.15 Ryan Starckenburg, ABS Genus, USA Building on Past Foundations to Create the Profitable Cow of the Future
14.45	John Maddux, Maddux Cattle Co, USA British Breeds used on our Ranch	14.45 Professor Albert De Vries, University of Florida, USA Profitability and efficiency of the five lactation average dairy cow
16.00	Dr Alison Van Eenennaam, University of California, USA Genome Editing approaches to augment cattle breeding programmes	
16.30	Prof. Frank Mitloehner, University of California, USA Rethinking Methane – Animal Ag's path to Climate Neutrality	

Tuesday Evening Conference Finale Q&A Panel Session

'The Next Generation – Do you dare to dream?'

19.00 – 20.00 Q&A Panel session with Harriet Wilson (McDonalds UK & Ireland Agricultural & Sustainable Sourcing Manager), Keith Gue (Dairy Farmer) and Ruari Martin (Myerscough Farm Operations Manager). Hear from and speak to three young inspiring individuals leading the way in agriculture, who are enthusiastic about the future of our industry and can see opportunities for themselves and others looking to make their career in the sector. Questions for the panel session can be emailed through to the secretary at heidi.bradbury@cattlebreeders.org.uk by Monday 25th January.

Registration to access the E-Conference costs just £45 and includes full membership of the club for 2021.

View the full programme and book your place online at www.cattlebreeders.org.uk

Follow BCBC on twitter @CattleBreeders Instagram @cattlebreeders and facebook British Cattle Breeders Club #BCBC21



UK Herefords report sustainable growth Supplied by The Hereford Cattle Society

As more and more people turn to the Hereford for its ease of management and grass converting abilities, we catch up with the society to explore its recent growth and development and future direction.

It is no coincidence the Hereford breed has seen a great revival in recent years, says David Deakin, breed secretary of the Hereford Cattle Society.

The Hereford breed has become commercially relevant and popular once again in the UK, and as market requirements and producers' outlooks alter, the breed is increasingly suited to the future beef agenda.

David explains: "Over 9,000 pedigree calves are registered each year, which is up nearly 50 per cent compared to 10 years ago. Looking at the equally important commercial numbers, over 185,000 Hereford sired progeny are now registered annually in the UK, including those on cross-bred suckler and dairy systems. This is an almost 90 per cent increase over the last decade.

"The increase in membership, registrations and commercial demand is clear. We have an animal that is both prolific and efficient at turning forage into a high-quality source of protein, along with the associated health benefits of eating beef higher in omega 3."

This demand is also found at the consumer-end of the supply chain and the number of branded Hereford Beef carcasses processed in 2019 was up over 350 per cent, compared to 10 years ago, adds David.

He continues: "Hereford Beef has been in vogue in recent times, gaining its own share of recognition in the consumer press, which is very encouraging and perfectly reflects its quality.

"However, much work is still to be done in promoting Hereford Beef to the public, which is essential in order to provide existing and potential stockists with the confidence consumers know our brand. Quality has never been an issue for Hereford Beef, but its recognition as a premium product has."



David Deakin



As a natural grazing animal, the Hereford can also play an important role in sequestering carbon by utilising a mainly grass-based diet explained David, helping to build soil fertility, capture carbon dioxide and encourage wildlife.

Hereford cattle do exceptionally well on grass-based diets, which we know plays a vital part in telling the sustainability story to consumers. But there is more to sustainability than limiting carbon emissions and promoting its sequestration, David continues.

"You have to take a holistic approach when it comes to sustainability, it's more than just a buzz-word. We need to consider the planet, people and profit. Our breed meets a myriad of needs in this respect.

"For one, we are producing animals which are docile and easily managed and this really does create a better and safer environment for people to work in."

David explains that increasingly pedigree and commercial producers are turning to the Hereford for financial reasons.

He says: "Time and time again we are hearing Herefords

generate a greater margin than their continental counterparts. Perhaps they don't make the highest price per head, but in any business, it's not about turnover, but left over, and people are increasingly recognising this."

The Hereford can reach modern carcass weight requirements quickly, while still achieving the animal's genetic potential, and laying down an adequate fat cover.

"The carcass is the cornerstone to much of our activity as a society, and with our provision of the scanning incentive, members are encouraged to scan for important associated traits. Selection of cattle based on these traits helps to disseminate commercially relevant animals throughout the supply chain once the genetics leave their pedigree homes into other systems," he says.

Further bolstering this drive for good breeding decisions and producing animals well-suited to the demands of the modern market is the superior carcass sire scheme, available to both members and non-members.

David says: "Via our superior carcass sire scheme, we are encouraging members and our commercial bull buyers to invest in animals with high carcass figures to produce what the market desires.

"We are striving for continual improvement within the breed, whether that's product or process. We warmly welcome new members and encourage those interested in stocking Hereford Beef to join us on our journey in producing high quality, healthy beef, sustainably produced with our planet and

Benefits of using artificial insemination (AI) in your cattle's breeding plan Supplied by AHDB Beef & Lamb

There are many ways artificial insemination (AI) can benefit beef producers. One of the main advantages is it allows producers with suckler herds to access high genetic merit sires with desired estimated breeding values (EBVs) that suit the herd's breeding programme. This allows high rates of genetic improvement to be achieved. High genetic merit stock bulls can often be expensive to purchase, so purchasing semen instead can be a more affordable option. Sires can also be selected for different groups of females; for example,

one bull for the heifers, a second to produce heifer replacements and a third to produce calves with superior carcass traits for the beef market.

Sweeper bulls are sometimes required, but AI can potentially reduce the need to keep bulls on the farm. This can be an attractive incentive because the maintenance cost for a bull can be around £45 per calf born, in addition to the purchase cost, which for top bulls may be prohibitive. AI also avoids the potential health risks associated with using natural service.

The choice of bull for the females being served is vital. It is important to check the EBV for calving ease (direct), as this indicates how easily a calf sired by a particular bull will be born. Herd management should aim to reduce the risk of calving difficulties because they have a negative effect on subsequent cow fertility and calf performance. Many other EBVs are available to help producers select bulls that will produce progeny to fit the farm's requirements and complement the females in the herd.

CASE STUDY

Edward Dean | Kirkhouse Farm, Cumbria

Edward Dean and his son Ollie are part of the AHDB Strategic Farm programme. Since joining the network in 2017, they have had the opportunity to access and utilise information from AHDB specialists and independent consultants, which has helped Edward to develop the business and make informed decisions on the farm. Now with their suckler herd of 130 cows, and four Limousin bulls, Edward has been focusing on improving his herd's breeding plan with the use of AI.

Edward says: "We have struggled in the past to buy in replacement heifers which had a high health status. The cows were losing their milking ability, so I wanted to breed our own replacements to improve maternal traits. We were also finding that there was no distinct gap between spring calving and autumn calving, it just seemed to be one extended calving period. As well as being difficult to manage, the uncertainty of when they were going to calve meant that we couldn't group them together to feed them appropriately prior to calving.

"We had previously tried using AI with synchronisation, but when we became strategic farmers with AHDB in 2017, we received support to try AI to a natural heat with the use of an Allflex SenseHub. We use this monitoring system to help us track the health status, reproduction status and well-being of individual cows.

"Once we got the hang of using the Allflex SenseHub, we used a technician to AI in June 2019 with a trial group of 40 cows. The conception rates were good; 68% held to the first AI service, and 11% held to the second AI service – the cows then went in with the bull and he got another 13% in calf giving us a total of 92% in calf by scanning. Previously, using synchronisation, we achieved a conception rate average of 60% over four years, so we were delighted with the results and we are hoping to be able to repeat that again."

Edward continues: "The calves looked really good and grew well. The AI usage has given us access to bulls we wouldn't usually be able to afford to buy, as well as giving us the choice to select from a variety of elite bulls. We have used a couple of different bulls for the AI, all the bulls are selected on EBVs for their maternal traits, but the better, more expensive bull we matched to our better cows. It will be another two years before they will get their opportunity to prove whether this has worked; when we breed from this year's heifers and see the maternal traits come through. On the other hand, the calving period has improved; we now have a distinct gap between spring and autumn calving, and we have certainly been pleased with the conception rates. So, from the results we have seen so far, it has been worthwhile."



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Taking it into your own hands

In an effort to encourage greater use of AI in the suckler herd, AHDB Beef & Lamb provided 50% funding towards DIY artificial insemination (AI) courses for suckler producers with over 30 breeding females. The subsidised courses had fantastic uptake and saw some really positive results for farmers wanting to get more involved in improving their herd's breeding plan.

Gavin Ogg did the course in November 2017

North Lincolnshire based Gavin Ogg has a suckler herd of Pedigree Limousin cattle consisting of 80 breeding females. After using an AI technician for several years, he took the opportunity to do the AHDB subsidised AI course in November 2017. Gavin said: "I had looked into doing the course before, but it was so expensive, so when I saw it at a reduced cost, I was really pleased to give it a go.

For a three-day course, the trainer was able to cover so much, and I got a real understanding of the whole reproductive system and how AI worked at its best. When I went to try it myself at home, I had a few that did not hold at first, but once I got more used to it, we had some good conception rates. I still work alongside a technician who helps me to synchronise the heifers and then I tend to AI the cows and the technician helps to AI some of the trickier heifers. It was a really good feeling when the first calves arrived that I had AI'd. The process also gives you more control to select for specific traits, such as ease of calving, which is something we have been aiming for."

Leona Woodcock did the course October 2019

Leona runs a small holding in North Lincolnshire where she has a small herd of Pedigree Simmental cattle as well as helping a neighbouring suckler

farmer when required. She took the AHDB subsidised AI course in October 2019 after being recommended by a friend to study at Bishopton Vets. Leona said: "I was wanting to use AI because it was very expensive to run a bull for my small herd, and learning how to do it myself has proved much more cost-effective, plus I have always been interested in genetics and AI gives me the opportunity to match the different bulls to my females based on EBVs. The course was really in depth with day one being all about the theory and then day two and three giving us the chance to try it out for ourselves. I served my cows myself in March this year and they all held at first which was reassuring, however, one then lost it so I had to re-serve her. It is quite different when you try it at home for the first time, but I have also been practising on other nearby farms so I can keep my hand in. I also used sexed semen on the cows to breed some replacement heifers to keep the herd going."



Edward Dean

Dairy genetics and livestock breeding

Supplied by AHDB Dairy



The dairy cow of the 21st century is a very different animal from that of the past. Her production has substantially increased, her somatic cell count has declined, fertility has improved, foot, leg and udder conformation has seen changes for the better, and many other traits, including lameness, longevity and mastitis, are moving in the right direction.

This is as much a success story for genetics as it is for management and technology. It is impossible to apportion the exact part played by each, and it will vary from trait to trait. But it is generally accepted that genetic gain has accounted for around two-thirds of the improvement made in milk production over recent decades.

However, more important than identifying the reasons for the improvements is to continue to make them – especially in traits affecting health, welfare and fertility – and genetic tools are playing an increasingly valuable role in this progress and should continue to do so.

There's a wealth of freely available information

from AHDB Dairy, who have no affiliation other than to farmers themselves. Working with EGENES (Edinburgh Genetic Evaluation Services), based at SRUC (Scotland's Rural College) they calculate all male and female independent genetic evaluations for production, health and conformation traits, the latter on behalf of breed societies. Genetic evaluations are published three times a year in April, August and December.

These independent evaluations should form the basis of all breeding decisions made by UK dairy producers, and it is estimated that over 95% of dairy semen purchases in the UK are based on AHDB data. Any non-AHDB derived breeding evaluation is likely to be either a foreign index (calculated from within a different cattle population and for different farming systems and trading conditions) or a commercial breeding company's proprietary index. Foreign indexes cannot be easily converted to be meaningful to commercial UK milk producers and proprietary indexes should be used

alongside independent data.

Developing a breeding programme

The starting point of a breeding programme should be to determine the ambition for the herd in 5-10 years' time. The choice of breed (either pure or cross) needs to reflect this goal, within the constraints of the farming system.

The Holstein has dominated the industry for many decades, and a move to another breed should not be made without considering the size of the Holstein gene pool, which is overwhelmingly larger than

that of any other breed. Across this gene pool there is a wide choice of sires which can now transmit high fertility and health to their daughters, a more robust type of animal than in the past, as well as the high production on which the breed has built its dominant position.

Crossbreeding

Crossbreeding is often considered by producers and should be carefully weighed up for its pros and cons. Its main benefit comes from heterosis or hybrid vigour, which effectively confers better performance (particularly in health and fertility) on crossbred offspring than the average of its parents. However, crossbreeding can lead to a loss of uniformity and raise questions for breeding subsequent generations, while improvements attributed to hybrid vigour are not passed down the generations. Just as with pure breeding, the continued use of high genetic merit purebred bulls remains essential.

BCBC Conference Preview & Autumn Newsletter 2020

Which choice of selection index

Whichever breed or breeds are chosen, producers are advised to always use an economic index (EPLI, £ACI or £SCI) as their primary selection goal. This will help them produce well-rounded cattle with desirable genetics for a combination of production, conformation, fertility and health, ultimately leading to the best economic performance. A small proportion of producers still select both males and females solely on the strength of their milk production potential, but this is not recommended on health and welfare grounds, because of undesirable correlations. Conversely, some producers have historically selected sires on overall type (Type Merit), but this, equally, is not advised as a primary selection for commercial milk producers. However, it should be noted that many functional conformation traits recorded by the breed societies are included as predictors within health and fertility indexes. This includes body condition score within Fertility Index, foot and leg composite within Lameness Advantage and udder composite within Udder Health Index, all of which are also included within EPLI/£ACI/£SCI.

A factsheet to help determine the best choice of selection index for a herd can be downloaded here: <https://ahdb.org.uk/knowledge-library/which-economic-breeding-index-is-right-for-me>

Once the primary selection goal is determined, secondary traits important to the herd can narrow down the ranking. For example, this could be fat and protein percentage for herds on a cheese-making contract or SCC Index for a high cell count herd.

If desired, producers can further add individual conformation traits to improve specific type traits within their herds. Details of type classification systems can be obtained from the breed societies which carry them out.

Interactive sire rankings for all dairy breeds can be found on the AHDB Dairy website (breeding and genetics section). These can be reranked to identify bulls which excel for any individual production or health trait.

Making use of sexed semen

The technology to produce sexed female semen has improved in recent years to the extent that conception rates close to those achieved with conventional semen are now widely claimed. With over 90% of calves born expected to be female, its use can cut the generation interval and increase genetic gain.

Due to the substantial difference in value between pure dairy and beef-cross-dairy bull calves, using sexed female dairy semen as part of a programme which breeds the lower genetic merit cattle to beef bulls has clear economic advantages. To maximise value in the beef-cross-dairy calves, bulls with a high genetic merit for carcass traits should be chosen. The AHDB National Beef Evaluations provide a genetic evaluation for commercial carcass traits in beef cattle, and can be accessed via www.ahdbbeef.egenes.co.uk. Care should also be taken to choose easy-calving beef bulls.

Herd Genetic Report

In addition to the evaluation data, AHDB Dairy also offers a Herd Genetic Report which not only provides a snapshot of the herd's genetic strengths and weaknesses, but also plots its genetic progress. The bespoke report is available free of charge for any milk recorded herd through AHDB Dairy.

Producers and their representatives can register for their report at: <https://ahdb.org.uk/herd-genetic-reports>

The future

Improvements to the tools of genetic selection are being made faster than ever before. Reliable, independent, national breeding indexes for traits such as feed conversion efficiency, gestation length, methane, ketosis and Johne's disease are being researched for potential inclusion in the national evaluations.

The speed at which genetic change can be made makes the responsibility of choosing a breeding direction even more critical than in the past. But failure to make progress in areas of health and fertility means cows which are milking in years to come could be more difficult to manage than those milking today.

Whilst management will always play the major role in disease avoidance and cure, it is certainly possible to stack the odds in the farmer's favour through better genetic selection over the long term.

A guide to dairy cattle breeding can be downloaded from the AHDB Dairy resources library at: <https://ahdb.org.uk/knowledge-library/breeding-briefs>



British Cattle Breeders Club Committee

- **President:** Professor Mike Coffey - Professor in livestock informatics at Scotland's Rural College
- **Chairman:** Clive Brown - Head of knowledge exchange, AHDB Beef and Lamb
- **Vice-Chairman:** Dr Karen Wonnacott - Ruminant nutritionist, Crediton Milling Co Ltd
- **Treasurer:** Henry Richardson - Senior Data Analyst with NBDC
- **Assistant Treasurer:** Andy Dodd - Dairy Business Consultant, The Farm Consultancy Group, WhiteAvon Consultancy

Other Committee Members:

- Lucy Andrews-Noden - Director, Priestcliffe Consulting
- Charlie Askew - Livestock husbandry lecturer, Easton College
- Dr Tim Byrne - Managing Director, AbacusBio International Ltd
- Dr Gary Evans - Business Development Manager for Neogen's GeneSeek Genomics business in Europe
- Tim Gue - Dairy Farmer, West Sussex
- Amy Hughes - Knowledge exchange manager, AHDB Beef & Lamb
- Andy King - Dairy farmer, Somerset
- Laurence Loxam - General Manager, Lely Centre Midlands Ltd
- Ruari Martin - Director of Farm Operations & Innovations, Myerscough College
- Fern Pearston - Animal genetics manager, AHDB Dairy
- Melissa Roberts - Beef Farmer, Shropshire
- Anya Westland - Lecturer, Myerscough College
- Alex Brown - Beef Breeding and Projects Manager, AHDB - Co-opted Committee Member
- Ben Harman - Beef Farmer, Buckinghamshire - Co-opted Committee

Irish Cattle Breeding Federation

“We exist to benefit our farmers, our agri-food industry and our wider communities through genetic gain. We do this by developing and applying science and technology to ensure that our farmers and industry make the most profitable and sustainable decisions”.

ICBF are a growing organisation of around 90 employees spread across 8 teams that cover everything from genetic evaluations and farmer support to software development and finance. Our vision in ICBF is to empower sustainable farming through collaboration and excellence in genetics and big data solutions. Presently, we have the largest beef genomics database globally and were the second country to launch dairy genomics.

For more information on our story, check out this video which goes through the last 20 years of ICBF. <https://www.youtube.com/watch?v=nt9kbSjSCY4>

We at ICBF find ourselves in a unique position as we maintain the national database for which

all data is held on bovine animals in Ireland. The flow of data to and from this national database can be seen below. Ultimately, the data is gathered from a variety of sources within the industry and is then used to produce information for farmers and industry partners. This leads to profitable and sustainable decision making at farm level.

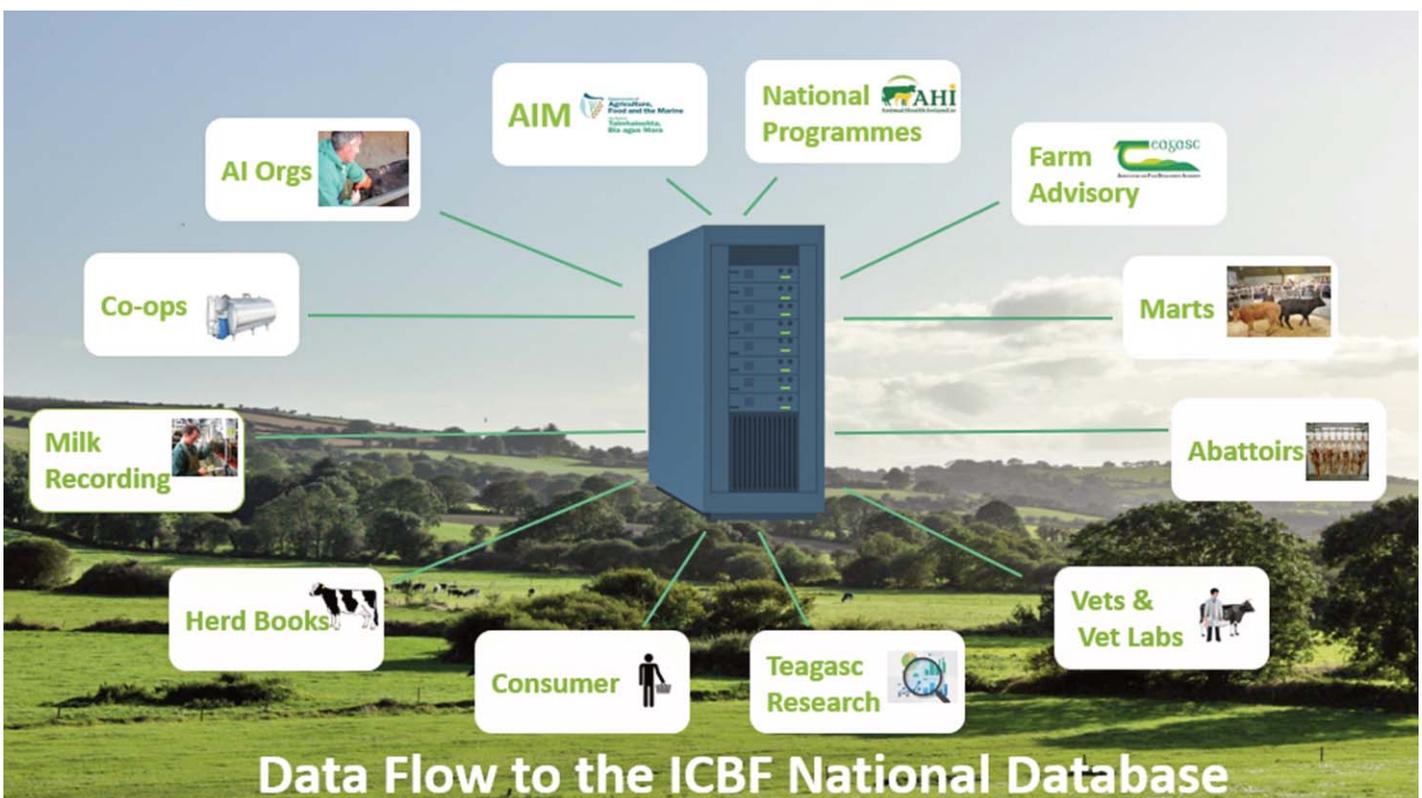
Our main function at ICBF is to ensure genetic improvement in bovine animals across Ireland. Genetic improvement can be identified as when the parents of the next generation are genetically superior to their contemporaries. This process happens through:

- The identification, ancestry, and quantitative data on those traits of importance for large numbers of animals in each generation.
- A genetic evaluation system to identify the genetically superior animals in each generation.
- A breeding programme design that ensures the required data is available, and that farmers use genetically superior animals in each generation.
- Well informed farmers and industry partners

who willingly provide data from their own farms/businesses and make full use of the information services provided by ICBF, and its service providing partners, in their breeding and farm management decisions.

Our subscription service, HerdPlus is used by over 24,000 dairy and beef farmers Ireland. The information stored in the ICBF database is compiled into various profiles, reports and applications that can be used to aid in the decision-making process. HerdPlus is a tool that can benefit everyone no matter what the breeding goals.

We are delighted to attend this year’s E-Conference. The renowned conference affords an opportunity to listen to industry experts in the dairy and beef sectors as well as networking opportunities with attendees and speakers alike. Its success can be seen year on year by the numbers in attendance from the UK and further afield.



Measuring rumination

Announcing the new smaXtec TruRumi™ Technology

How to understand your dairy herd even better? The fact that smaXtec Boluses are able to measure the inner body temperature in the rumen was already revolutionary, but now we have succeeded in adding an additional parameter to our unique cow understanding system - rumination.

As a result, the system can now do even more and enables you to understand your animals even better. The direct measurement allows unique accuracy and reliability. The system is maintenance free and guarantees early detection, for which smaXtec is well known.

What makes the TruRumi™ TECHNOLOGY so special?

The smaXtec Bolus measures rumination directly at its source - the reticulum. Only smaXtec can do that. The system thus guarantees unrivalled precision and informs you with unparalleled accuracy about the number and duration of contractions of the rumen. This unprecedented data, combined with information about inner body temperature and movement activity of the animals, enables you to gain even more knowledge about your herd and set a new standard in early detection on your farm. With the additional parameter rumination, you are able to make even better decisions - in health and feeding as well as in oestrus and calving.

But not everything is new, as before, you continue to benefit from the countless advantages of the smaXtec bolus technology compared to external measurement technologies. smaXtec measures inner body temperature, activity and rumination 24 hours a day, 7 days a week. There is no tedious maintenance necessary. Furthermore, there is no risk of loss and injury due to the measurement position.

Even better health monitoring of your dairy cows guaranteed

Thanks to the continuous measurement of rumination, inner body temperature and movement activity, you can draw even more precise conclusions about diseases and their severity. This allows you to further improve animal health and



Chris
Howarth

welfare on your farm as well as production success. For example, due to the measurement of inner body temperature and rumination, you can detect E. Coli mastitis, which often has a severe, highly acute course, up to four days before external symptoms become visible. This allows you to intervene earlier and avoid a loss of the affected udder quarter or even the cow. Displaced abomasum can also be reliably detected at an early stage thanks to its unique combination of parameters. It often occurs when a reduction in both water absorption and rumination is evident – you get informed about both by the smaXtec system.

Detect calving at an early stage and always keep an eye on the period around calving

Based on the characteristic decrease in inner body temperature, the smaXtec system notifies you on average 15 hours before calving. In addition, rumination data enabled by the TruRumi™ technology provides you with information about the start of the calving process. Furthermore, you can observe your animals even more closely during the critical period around calving. This allows you to take necessary measures earlier if complications occur and save the life of your cow in an emergency. If a cow falls ill with milk fever shortly after birth, the inner body temperature, movement activity and rumination drop noticeably. The continuous measurement of these three parameters using smaXtec Boluses enables you to keep a close eye on your cows during the critical period

around calving and to intervene immediately if problems arise.

Detect oestrus even more precisely with TruRumi™

The change in rumination combined with movement activity enables even more precise detection of oestrus, as rumination activity decreases noticeably during the oestrus period. Together with the automatically generated insemination time window, you can optimise the insemination success and the reproduction figures on your farm significantly.

Improved feeding management with TruRumi™ TECHNOLOGY

Thanks to the measurement of rumination directly in the rumen, smaXtec provides you with valuable information about feeding status of animals in different lactation phases. You can evaluate rations and detect problems in feeding management at an early stage. By adjusting feeding, you support your animals to achieve the best possible performance while ensuring animal health.

The smaXtec TruRumi™ Technology sets a new standard in early detection on dairy farms. Thanks to the unique further development of the smaXtec system, you will receive even more comprehensive information on the health, reproduction and feeding status of your animals and thus understand them even better. You will be able to detect diseases even more precisely, heats even more accurately and problems during feeding even more reliably. At the same time, you save work and costs and have the certainty of always having everything in view.

Chris Howarth, Chief Sales Officer/Global Sales Director for smaXtec, is a regular attendee and supporter of the BCBC conference and is proud to sponsor the 2021 Virtual event and looking forward to the opportunities the virtual event will bring.



ADF Milking

The Automatic Dipping & Flushing system from ADF Milking was developed by founder and engineer James Duke in 2003 when he had a vision to increase efficiency in post milking hygiene methods. By 2004 the first prototype system was installed on 10 farms in the UK, and in 2005 the Automatic Dipping & Flushing system was officially launched and was awarded the Prince Philip Award at that year's Royal Association of British Dairy Farmers event.

Fast forward 15 years and ADF Milking is now the market leading product in automatic dipping and flushing and has been recognised by dairy industry experts around the world for the innovative technology. The company are proud to be helping thousands of dairy farmers in over 30 countries worldwide to improve the health of their herds and save money on vet bills.

This year ADF Milking were delighted to win their second Queen's Award, this time for International Trade. They had previously won a Queen's Award for Innovation in 2013. This achievement is the latest in a long line of international awards in four different countries.

"We have a passion for improving cow health as a key driver for increasing farm profitability," says ADF Milking founder James Duke. "Our commitment to improving cow health means we are continuously developing the ADF Milking system by harnessing the latest technology and design ideas."

"We are fortunate enough to be able to draw on the diverse experience we have gained from billions of milkings, performed at tens of thousands of milking points across the world – from large scale dairy operations to small owner-manager farms. The range and depth of this experience has helped us understand exactly what is needed in the challenging conditions of the milking parlour. We aim to achieve simplicity, efficiency and reliability – goals we believe we have surpassed to stunning effect with our unique ADF System," he says.

The award winning Automatic Dipping and Flushing system from ADF Milking helps dairy farmers to reduce mastitis cases, save time and money and increase the efficiency of their milking parlours. The ADF System automates a crucial part of the milking routine by automatically dipping a

ADF James Duke

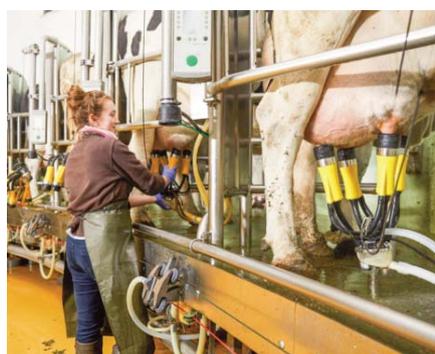


cow's teats and flushing each liner between milkings. This automation removes the risk of human error and immediately protects the cow from disease.

The ADF System works in just five easy steps:

1. Sanitised liners are presented in correct orientation, ready for milking.
2. As the vacuum is shut off, teat dip is injected into a manifold on the claw piece.
3. Dip is applied to the teat at the optimum angle using Dual Injection technology.
4. Teat is dipped and protected within seconds of milking being completed before exposure to harmful contagions in the environment.
5. After removal, every liner is sanitised and thoroughly rinsed six times ready for the next cow.

The benefits of the ADF System start immediately post milking. Reducing the workload helps farmers to save money on labour costs and protecting the cow against infection reduces expensive vet bills. Saving on labour costs, vet bills, and antibiotics can also increase profits. The ADF System improves cow throughput, returning cows to the feed quicker



and allowing more time for rest and milk production. This greatly aids efficiency and improves farm profitability.

Healthy Cows

The ADF System protects the cow against bacteria immediately after milking. Automatically dipping the cow's teat before she is exposed to harmful bacteria in the environment helps to reduce mastitis and other infections. Each liner is then thoroughly flushed with a sanitising solution leaving a clean liner ready for the next cow to prevent cross contamination. The combination of automatic dipping and flushing helps dairy farmers to fight against mastitis and lower somatic cell count. Overall herd health improves as healthier cows move up through the herd.

Saving Time

Traditional post milking routines are time consuming and can be prone to human error. The ADF System automates the post milking process so that farmers can make substantial time savings. Typically, installation of the ADF System will result in significant improvements to throughput. This leads to greater labour efficiency and reductions in energy consumption and parlour running costs. By automating the dipping and flushing process, farmers can reduce the number of staff members in the milking parlour, freeing up time to be used more productively on their farm.

Saving Money

The ADF System allows farmers to save money on vet bills, antibiotics and labour costs which results

in increased profits. Automatic dipping and flushing reduces the need for extra labour in the milking parlour, enabling their farm to be more cost effective. With the double action of keeping cows healthier and lowering labour costs, farmers will start to see the benefits of using ADF where it matters most – in their pocket.

Improving Efficiency

Dairy farmers can maximise their parlour's throughput by automating the dipping and flushing process. The ADF Milking System significantly reduces workload and operator movement, meaning that they can speed up milking time or reduce the number of staff members in the parlour. The Automatic Dipping & Flushing system creates a calmer milking parlour and helps cow traffic to run more smoothly. A calmer parlour means less stress for the cows and can result in improved milk let down.

Compatibility

The ADF System can be installed on any type of milking parlour – new or existing. ADF has experience in fitting their system across all parlour types, makes and configurations. The innovative design means that installation can be carried out between milkings, resulting in minimal disruption to the farmer and their herd. Immediately after the installation is complete it can be put into operation and farmers will begin to experience the benefits.

Cow Longevity

The significant financial benefits of cow longevity are often overlooked. Yield per year of life dramatically increases with each additional lactation. Heifers tend to be more hassle and yield less. They are also far less efficient as much of their consumed energy is used for body growth. Older cows know the ropes - they are easy to milk and are efficient converters of feed to milk. Excessive cost of replacements can be avoided by improving cow health and therefore longevity. The ADF System can play a considerable role in cow longevity and generate a significant impact on increased profitability.

"We are delighted to be a main sponsor for the British Cattle Breeders Club Conference in January. We know how important it is to support our British farmers, especially at times like this. We are very much looking forward to being a part of the event," says founder James.



An historical account of GB's dairy cattle breeding industry book 'A Bovine Thriller'

by Dr Brian McGuirk

Members of BCBC may be interested to know that one of our long-standing members, Dr Brian McGuirk, has published a book entitled "A Bovine Thriller". This 125 page book is an historical account of GB's dairy cattle breeding industry, from the early 1940s, when the first commercial Artificial Insemination services were established in GB, to "about 1990", the effective end of the Milk Boards, and their technical services, including the provision of Artificial Insemination (AI).

The book highlights the role of the Club in that period. It focusses on the activities of three scientists, Prof. Alan Robertson OBE in Edinburgh, and Dr Chris Polge and Dr Tim Rowson OBE in Cambridge, whose achievements meant that the UK took a leading role worldwide in dairy cattle breeding matters. Through their frequent presentations to BCBC's conferences, they were also important figures in the Club, with both Prof. Alan Robertson and Dr Tim Rowson serving as Presidents of BCBC.

While a Chapter in the book is devoted to activities in Scotland, the focus is on England

and Wales. The book is an historical description of the industry (cow numbers, milk recording, cow and herd numbers, breed performance and importance, as well as AI usage), but also an up-to-date description of subsequent technical developments, of which their work was an important prelude.

But the book also has a critical two Chapters on dairy breeding programmes, of which the Milk Marketing Board of England and Wales, the MMB, was an early leader, with its Dairy Progeny Testing Scheme (DPTS). Nowadays, the MMB is perhaps best known through the activities of a successor organisation, Genus.

Brian was closely associated with the MOET project in Northumberland, which made available to UK producers a range of genetic "products", and applied the then latest ideas on genetic evaluation and embryo technologies.

For further information or to purchase a copy please contact Brian on 0131 447 2795 or brianmcguirk@hotmail.co.uk

