



Reducing your carbon footprint

This comprehensive series aims to offer producers clear and practical information to help them increase efficiency and save money. It highlights affordable and effective methods to reduce greenhouse gas emissions on UK dairy units.

Topic 1: Cutting through the 'carbon jargon'

Topic 2: Fewer emissions from farm waste

Topic 3: Improving feed efficiency

Topic 4: Reducing emissions through breeding

Topic 5: Saving energy and fuel

Topic 6: Get water wise

Reducing carbon emissions through breeding is nothing new. Put another way, UK producers have been breeding more efficient cows, in terms of milk production and longevity, for years and most are already reaping the benefits through better cow performance over a cow's lifetime.

And this has reduced dairying's impact on the environment.

Two things are key to reducing emissions and maximising efficiency through better breeding, according to DairyCo geneticist Marco Winters. "Improving production efficiency and reducing 'waste' by increasing longevity are the drivers here. It's all about getting as much milk as possible out of as few cows as possible," he says.

Fewer cows

And that's been the trend, thanks to breeding, for the past 20 years. As yields have risen by 2% each year – that's about 150kg of milk per heifer each year – so cow numbers have fallen. "We're milking nearly half the number of cows that we were milking two decades ago."

Breeding balanced cows with good milk production and longevity is now the goal on many dairy units since this is the type of cow that's most economic and efficient

Balanced approach: careful breeding is key to reducing your herd's carbon footprint

Selection for production and longevity is key to reducing every herd's carbon footprint

Fewer cows and emissions

Breeding to minimise emissions and increase efficiency is nothing new. We've been doing it for years, according to two leading dairy geneticists. And, as research and development continues, the cows being milked during the next decade will populate some of the most efficient and long lived herds ever.

text **Rachael Porter**

to milk. She's relatively trouble free and gives plenty of milk. "And she's more environmentally friendly too," adds Mr Winters.

He says that production efficiency has to continue to improve and integral to this

is increased longevity. "Select for cows with a lifespan proof of more than 0 and the same for fertility index, since this is a major factor in culling. And fertility index should also be greater than 0.

"Along side this, producers should also be



Dutch study to reduce GHG emissions

Dutch researchers are almost one year into a four-year study to examine the impact of selecting for certain traits on dairy cow greenhouse gas emissions. Breeding cooperative CRV is working closely with Wageningen University to find out if breeding can be used to reduce GHG emissions and by how much.

"We're in the process of identifying traits that have the greatest impact on GHG emissions before we investigate further," explains CRV's researcher René van der Linde. "Increasing production and longevity are two, but

we're also considering better health and fertility and feed conversion efficiency."

A PhD student from the university will then look at these traits in more depth with a lifespan model to determine just what impact each trait has on reducing emissions.

"We're taking our ideas about what should reduce emissions and putting the theory to the test," adds Mr Van der Linde. "And, later in the study, when we've those answers we'll also be looking at the possibility of estimating GHG emissions at whole farm level."

selecting for production efficiency and size. We're looking to breed high yielding but smaller cows – nothing too big. So select for less than 1 on stature."

Although his recommendations are a bit crude at the moment, Mr Winters and his team are considering developing an index for optimum size. "Producers are aware that some cows are already too big and are selecting sires to rein that in a little."

He stresses that producers mustn't take their eye of milk production and

continued selection for that is also vital. "It's critical to look for production and longevity – a balance. There's a danger that some producers are not breeding for production and shifting their focus to type traits."

Type merit

"Focus on yield, as well as fertility and longevity. And look to the functional type components of udder and feet and legs, rather than type merit alone," says Mr Winters.

"It's important to keep your eye on the ball with production. Avoid bulls that are less than 70 on PLI, as PLI now combines 45% emphasis on production with 55% on 'fitness', and avoid slipping back with milk yield."

He adds that breeding has already made a huge impact on herd productivity and efficiency and work is continuing to ensure both increase in the future. "We're looking at being more precise, which will be possible with genomic tools. A direct feed conversion efficiency index would be useful to producers."

Disease, lameness and other 'longevity' indexes would also be extremely useful and work is on-going.

"We have a good handle on increasing production, so the focus continues to be on how to reduce 'waste'," he says.

Johne's disease and TB are also of interest to geneticists. "We may even be able to identify bulls that are more likely to sire daughters that are more resistant to bovine TB in the future.

"The more data we have, the more we can do. There will be a lot of exciting developments in the next five to 10 years."

Future work

Work to look at breeding for increased feed efficiency is already underway. SAC geneticist Eileen Wall has been looking at what a breeding goal would look like if carbon efficiency was chosen as the most important selection trait. "The question is the effect this would have on the economic traits, such as milk production, fat, protein, longevity and profitability," she explains.

"And the good news is that there's no conflict. A low carbon footprint cow would also be a high production, efficient and long life cow. There's not an exact synergy, but the two do compliment each other and if a 'greenhouse emission' gas index was added to PLI then the change would be positive in terms of economic efficiency too."

Dr Wall says that breeding cows that produce fewer emissions is all about optimisation. "We want to breed replacement cows that are more profitable, as well as better for the environment, and fortunately elements of the two are linked. There's certainly a strong correlation with feed efficiency.

"And fertility is important too. Empty unproductive days impact on the environment. There are emissions, but no milk production 'trade off'. So the more days a cow is producing milk during her lifetime, the smaller her footprint." |