Virtual grazing technology brings new options to UK livestock

Technology advancements are providing new opportunities for dairy producers as Nofence virtual grazing technology becomes widely available in the UK.

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Real-time tracking data allows farmers to know where stock are at all times, with collars alerting them to an animal's location in the rare events of a pulse or escape.

Established in Norway in 2011 with more than two years of testing on UK farms, Nofence uses a combination of GPS, mobile data network, audio signals and solar power to work with animal behaviour and create a 'virtual pasture' that can be monitored and moved with a smartphone app.

The Nofence app allows farmers to set virtual pasture boundaries that can be moved within a matter of a few seconds. Livestock wearing Nofence collars can then be turned out into the area to graze with no physical fencing.

Weighing 1.4kg for cattle, Nofence collars have integrated solar panels to ensure long-lasting battery life throughout the grazing season. When an animal crosses the Nofence boundary, a three-stage audio warning will sound. If the animal does not turn around when cued with the third stage of audio, it will receive an electric pulse equivalent to 18% of power from standard electrical fencing. When a collar issues a pulse it immediately sends a pop-up notification to the farmer via the Nofence app with the location of the animal. If the animal continues to move in the wrong direction, it will only receive a maximum of three pulses before it is classed as escaped.

Again, the farmer is notified, and the location of the animal is tracked. When the animal crosses back through the boundary to return to the herd, it does not receive a pulse, with animals typically going back on their own in the rare case of an escape.

Instead of cows using their sense of sight to see a physical fence to keep them in, they use their sense of hearing and it has proven to be very effective. Through observations of herd behaviour on more than 30,000 head of livestock logging more than 75 million grazing hours, a typical farm will have just one pulse per every 30 audio cues. The app allows farmers to track the number and location of audio signals and pulses given to individual animals to allow them to adjust pasture design if required.

Utilising GPS surveying, the Nofence app allows farmers to set virtual pasture boundaries that can be moved within a matter of a few seconds. Livestock wearing Nofence collars can then be turned out into the area to graze with no physical fencing.

Economic and environmental benefits of managed grazing

According to farm consultant James Daniel, Managing Director for Precision Grazing Ltd, virtual fencing is a game-changing tool that will help to enable wide-scale adoption of managed grazing techniques.

In 2020, James trialled the Nofence system to validate its suitability for the UK where stocking rates on managed grazing systems often exceed 100 head/ha and animals are moved regularly to new pasture. Since then, he has been working with five different UK livestock farmers on a pilot project to integrate Nofence into a variety of managed grazing systems.

"Managed grazing increases the productivity of pastures and livestock by working with the plant's natural growth pattern. If animals are left on a paddock for too long (set stocked), plants are 'over grazed' which leads to low productivity, bare soil, pasture degeneration and reduced forage production which ultimately leads to more expense for the farmer," explains James.

The best way to maximise forage production is to give pasture adequate rest periods (21-60 days) in between short grazing events (1-3 days) during the growing season. This need to move animals often whilst having a flexible rotation length is something virtual fencing can easily enable.

Done correctly, managing grass comes with huge benefits. Work from AHDB has found set stocking to have an annual yield of six tonnes DM/ha with 60% utilisation for a total of 3.6 tonnes DM/ha utilised. When cattle are moved every 2-3 days, utilisation goes up to 75% for a total of nine tonnes DM/ha.

"There are two ways to look at production increase potential. We can keep more animals in the same area which might allow

an increase in stock or enable parts of the farm less suitable for grazing to be used for environmental benefit. Or we can reduce inputs, like nitrogen fertiliser or purchased feed, and maintain the same output with a lower variable cost," added James.

When looking at the value of one additional tonne of DM per ha, this equates to an additional 100kg liveweight gain/ha valued at £200, 50kg carcase weight/ha valued at £200, or an additional 0.3 acres valued at £2,000. Alternatively, it could enable input savings equivalent to £100 on nitrogen fertiliser, £120 on silage or £280 on concentrate feed.

It is not unheard of for farmers to unlock the equivalent of an additional 30-50% area on their farm by increasing productivity. "There is no more cost-effective way to expand your land availability than improving your grazing management," explains James.

"From an environmental standpoint, managed grazing is a powerhouse, benefitting wildlife habitats, rainfall absorption, microbial diversity and carbon sequestration. Perennial plants like grasses and herbs are putting 40-50% of the energy they generate from photosynthesis into the soil. Some of that enables root growth and some of that is directly feeding the bacteria and fungi that live in the soil in exchange for nutrients. This process is fundamental to carbon sequestration. Plants are most efficient at this when kept in their vegetative stage. The most effective and beneficial way to do this is with grazing animals that are being managed properly."

Opportunities for UK producers

Two of the biggest barriers farmers face when capitalising on managed grazing opportunities are access to skilled labour and fencing infrastructure.

Weighing 1.4kg for the cattle collar, Nofence collars have integrated solar panels to ensure long-lasting battery life throughout the grazing season.

While Nofence does not 100% remove those two factors from the equation, it significantly reduces the impact allowing for minimal fencing based on areas of risk identified by the farmer and freeing up hours of their day that can be spent on planning their grazing strategy and other areas of their business.

Last year, we helped a Northumberland farmer convert his electric grazing system to Nofence. Before, it was taking him five hours a day to move fences, leaving him with no flexibility on taking time off. Once his system was transitioned, it only took him a few minutes a day to move his virtual fences.

Through the pilot project with Precision Grazing, we have seen farmers that were already good grassland managers take things a step further because time is no longer a constraint.

But across the board, we have seen a huge improvement in the quality of life of Nofence users due to the amount of time they are saving and the real-time data, which is allowing them to make fast judgement calls.

The future of Nofence

While virtual technology like Nofence is going to change the future grazing landscape – both from a physical and business point of view, the quick adaptability of the product and data analysis will see it changing to a multi-faceted management tool in the future.

Nofence is constantly analysing data and data capturing opportunities to see what other functions can be integrated into the product. We also firmly believe that in order for it to serve farmers best, it must have their input, so we are regularly working with Nofence customers on what features will best benefit their businesses.

Future developments the company is working on include an optional automatic paddock movement timer based on key data such as pasture cover, crop growth rate, soil type, weather conditions, livestock age and weight.

Nofence is also exploring how animal activity data, such as grazing duration, resting and socialising can be used to improve animal health as early indicators of illness or serve as a heat detection tool.

Ultimately, Nofence is heading in the direction of being an on-demand pocket-sized grazing manager that will give users real-time advice based on their herd's needs and unique environment and access to managed grazing education.

Since its inception, the goal of Nofence has been to support farmers by giving them an effective way to improve business efficiency and animal welfare while supporting the environment – but ultimately, to improve their quality of life. The future of grazing is here, and it is only going to continue to get better. ■