

Smart Grazing



Researchers are studying grazing of dairy cows at Lindhof, the University of Kiel's experimental farm. It is not just the extreme drop in milk prices that is behind this alternative to more expensive animal housing: The scientists are also developing an App to help improve pasture management. Text: Klaus Sieg

With their large, dark eyes, brown fur and delicate build, they look almost like deer. "They are real beauties on four legs," says Ralf Loges, as he stands by the fence. The calves quickly gallop up to him and snuffle his hands. "These animals are inquisitive, trusting and intelligent, and incidentally are the only cows that can walk backwards over a lengthy distance."

Jersey cows have obviously made quite an impression on the scientific manager of Lindhof, located in Schleswig-Holstein, Germany. So much so, that he uses the song title "Jersey Girl" to advertise the research project for ecologically efficient grass-fed milk production that has recently started up on the 150ha experimental farm for organic farming at the University of Kiel. This song, written by Tom Waits and popularised by Bruce Springsteen, is about the love for an innocent country girl. That fits quite well. But of course, the Jersey cow has more to offer than just beauty and innocence: At 5.7%, its milk is much creamier; and at 4% has a higher protein content, compared to milk from a black-and-white cow. That makes it suitable for processing cheese and butter. Jersey cows are also very fertile, and annual calving is easier to control. "The farmer can have the entire herd calve within a six-week block, saving a lot of stress which would otherwise go on throughout the entire year."

Most economical feed

The breed is, however, particularly well-suited to grazing. "With a modern black-and-white cow, you cannot just simply open the barn door," says Mr Loges. The dairy cows are bred too much for performance, and thus need high energy food. The Jersey cow, on the other hand, is considered the most efficient breed at converting grass into milk, and can be out to pasture for most of the year.

"With grass feeding, we are trying to further develop what has over time become a very uncommon form of milk production in Germany, and to test it for economic and ecological feasibility," continues the scientist.

To make sure the cows can eat their fill, high quality grass with white and red clover blossoming among it grows on the idyllic pasture. The grass contains the energy for milk production, and the clover varieties; which are legumes like soya beans, provide the necessary protein. The humming of thousands of bees also impressively shows that the clover contributes something else as well: Biodiversity. That particularly pleases the bee-keeper on the farm, who no longer has to buy sugar from a discount store to keep his bees from starving after the rapeseed blossom season.

But how does this help dairy farmers? "Pasture grass is not only the most natural, but also the most economical feed for cows," says Mr Loges. With the typical system for conventional milk production in Schleswig-Holstein, the focus is on achieving the maximum output from each individual animal. The consequences of this are a short productive life of 2.4 years on average, and pellet feed making up about one third of the overall feed, amounting to almost 2.5t a year per cow.

Standard pellet feed consists of grains, rapeseed and soya groats; the latter usually produced in Brazil or Argentina, often at the expense of rain forest regions and using genetically modified varieties. The share of soya groats in the pellet feed of one dairy cow uses the yield from a quarter of a hectare in these countries.

The price paid for this and for the local grain is determined on the global market, and is generally twice as high as the price for grass. For an energy content of 10 megajoules, pellet feed costs 47 Euro cents and maize silage 25 cents. "With grass, the price can be significantly lower than 20 Euro cents," explains Mr Loges.

At Lindhof, the animals are used for milk production for as long as possible, for ethical and economic reasons. A Jersey cow manages on 300kg of pellet feed a year. And what is more, the Bioland-certified farm produces this from home-grown grain and high protein lupins.

A prerequisite for grazing is having sufficient land near the farm. "We have that with most of the farms in Schleswig-Holstein," says Mr Loges. But the problem is this: A pasture produces nine tonnes of dry feed per hectare a year. Maize, on the other hand, comes in at 15-16t. Grazing therefore demands a lot of space.

On the other hand, pasture also grows in places where grain and maize cannot thrive. Furthermore, organic farms have to add legumes like clover or lupins to give their soil sufficient nitrogen. One in four fields on an organic farm has a clover grass cover crop. Many of these farmers, however, specialise in grain production and have no use for the clover. Maybe co-operative efforts with dairy farms could give these legumes added value.

However, knowledge about how the animals are best kept on the pasture has been lost in many places or is not backed by scientific knowledge. At Lindhof, scientists are therefore working on things like developing a pasture management system that is suitable for a wide range of landscape types in Schleswig-Holstein.

The Smart Grazing App, which takes weather data, grass length, soil quality and other factors in account, is being developed to help dairy farmers make the most efficient use of their pastures.

Take Ireland as an example. Like their counterparts in New Zealand or Australia, Irish farmers produce a litre of milk for 20 Euro cents, thanks to their sophisticated pasture feeding. A black-and-white cow in Schleswig-Holstein kept in a barn all year round needs an average of 35 Euro cents to do the same.



The perfect seed mix

Mr Loges marches across one of the fragrant pastures with a grass measuring device. He uses it to determine the average grass height. This way, he knows how much dry mass is on the pasture and when the herd can next be driven there. Or when the grass has to be silaged, when the 80 cows cannot keep up; as is the case in May or June.

The scientists at Lindhof also determine when the blades have reached the right height for grazing. "In the past, farmers used to let the grass grow until it was as high as their boots, but now we only let it grow to about 10cm." At this height, the animals can pluck it up with a single bite. That way, less is left standing, and less is trampled down. The animals can also digest the young grass better and produce less methane than when their rumen has to break down older blades of grass, using more energy to do so. This improves the greenhouse gas footprint of the pasture milk.

The Lindhof team is also researching the composition of grass varieties, how they develop and which can be best reseeded. To this end, samples are regularly collected from precisely mapped areas. The blades of grass are meticulously sorted, identified and counted. Which grass varieties have become established? What is the proportion of clover in the grass? How do the plants grow with grazing - and without? And above all, it is interesting to see the changes that occur in the grass varieties when they are bitten off.

This is how the feasibility of different seed mixtures is tested. "We want to use this information to develop seed mixtures that the farmer can resow," explains Mr Loges. It is also important to know the best intervals for pasture grazing, whether it is every three, four or six weeks. Another task is to determine exactly what the potential yield of the pasture is, and what the cow can do with it. Various meadow herbs, such as chicory, buckhorn or caraway are also tested.

Consumers want cows outdoors

Outside, other colleagues are measuring which climate gases the meadow not only emits, but also binds, and in what volumes. The latter is what makes pasture an ecological form of farming. On the other hand, a cow that is fed mainly on grass produces more methane in its rumen. How much exactly and by what proportion it can be reduced by feeding younger grasses is a question the project is addressing.

Improved use of dairy cows for meat production would also reduce the greenhouse gas footprint. To this end, Lindhof is cross-breeding other types of cows with the Jerseys.

The project for ecologically efficient pasture milk production could, therefore, produce a lot of food for thought. "The abandonment of quotas and the extreme drop in the price of milk have caused people to rethink things. We can see this in the increasing number of visitors we have, especially conventional farmers," says Mr Loges.

The price for organic milk has not been so affected by the milk crisis. But not all dairy

farmers fit into the organic niche market. Conventional pasture feeding would help them reduce their costs and open up new marketing opportunities, with reference to the ecological advantages and the quality of the milk. The golden-yellow butter from Ireland is, for example, very popular. Its appealing colour and consistency come from grass feeding, which makes the percentage of unsaturated fatty acids in Irish milk particularly high.

"But putting the economics aside, the bigger picture is just as important, isn't it?" Mr Loges casts his gaze over the blue-green Baltic Sea and the colourful meadows. And over his Jersey Girls, grazing happily away. He's right about that.