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DairyTalk

Breeding. Genetics. Management.

AI & BREEDING · COVER STORY

“900 cows before lunch”

A New Zealand sharemilker builds mating plans on a 30-dollar subscription that used to take months.

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DairyTalk

Breeding. Genetics. Management.

The technical magazine for
modern dairy cattle breeding

Twice a year. In English and German.
For everyone who makes breeding decisions.

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EDITORIAL

PUT KNOWLEDGE IN CONTEXT. MAKE BETTER DECISIONS.

Helmut Demmelhuber

Dear readers,

dairy farming is changing. New breeding methods, genomic information, digital systems and artificial intelligence are opening up possibilities that were barely thinkable a few years ago.

At the same time the decisive question stays the same: how can we make better decisions for our animals, our herds and our businesses?

DairyTalk wants to create a space for that. For well-founded technical articles, practical experience, international perspectives, and also for subjects where there is no easy answer.

Neither the newest technology nor the loudest opinion should be at the center of it, but what actually holds up in practice.

I will be glad if DairyTalk helps to set new thinking in motion, to share experience, and to look at cattle breeding and dairy farming from different points of view.

I hope you enjoy reading it.

“Better decisions begin with better questions.”

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Matthew Zonderop, Matamata · Photo: The Bullvine, thebullvine.com

AI & BREEDING · INTERVIEW

“900 cows before lunch”

A New Zealand sharemilker builds mating plans on a 30-dollar subscription that used to take months. What he does would not be possible on a German farm today — and the technology is not the reason.

INTERVIEW: HELMUT DEMMELHUBER

Since one night in spring, when a spreadsheet he had built over five weeks collapsed two weeks before the start of the breeding season, he has been developing an artificial intelligence – based mating system that is now in use on several New Zealand farms. The New Zealand trade press has covered it in detail; at Fieldays 2025 he was a finalist in the Innovation Awards.

Matthew Zonderop runs a herd of about 400 KiwiCross cows as a 50:50 sharemilker near Matamata in New Zealand's Waikato. The farm belongs to someone else, the cows and the labor are his, and the two of them split the milk check. He cannot write code. He gets by in Excel the way most people do.

For German readers, the interesting part of this story is less the technology than a precondition that does not exist here. We come back to that at the end.

"It was just cow data"

Mr. Zonderop, the story of how you got started is well known by now. What usually gets told wrong?

That it was a plan. It was Friday night, half past ten, five weeks of work in spreadsheets, and the whole workbook was lit up red. I had heard about ChatGPT and thought: I have nothing to lose, this is not personal data, this is just cow data. A typo was the cause. Found and fixed in seconds.

And then?

Then it asked whether I wanted the file analyzed further. I clicked yes. Over the next three hours the system pulled connections on its own — sorted lactation data, broke out somatic cell counts, separated fat and protein. Then it picked up the sire data from another worksheet and offered a comparison without being asked. That is where I stopped. Thirty seconds had done what I had spent five weeks on. The second thought was less comfortable: I had just woken something that every breeding company in the world has guarded for decades.

How long did it take from there to a system you could actually use?

Six months. YouTube tutorials after the evening milking, podcasts in the truck while shifting cows, wording copied, rewritten, fed back in. At some point I asked the system itself: can you help me ask you better questions? That was the turning point. You do not have to write code for artificial intelligence — it writes the code. What it does not have is the part that is written down nowhere.

For example?

Why an American Holstein sire on a KiwiCross cow leads straight into a shed full of expensive, oversized disappointments. Why the guardrails you set on an all-grass farm will ruin a farm running partial TMR. That was in my bones. What I was missing was a tool that can hold all of it at once. And no human can: 400 cows times 26 traits times eight generations of pedigree times a dozen sires in working memory — you do not fail at that out of laziness, you fail at it because of physics.

The office is on the hillside. The herd is the database.

How a job runs

Describe a specific case.

A farm calls, say 900 cows in the South Island. The farmer goes into MINDA, the national herd database, and exports a CSV file. Everything is in there: phenotypic data, the full genomic profile, production history, health data, liveweights, every case of mastitis, every metritis, every lameness event, every lactation curve going back to the day the cow was born. One file. Standardized. Ready to download.

And then the system does the math?

First I spend twenty or thirty minutes on the phone with him. More components? Better rebreeding? Somatic cell count down? Tighten gestation length? Protect longevity? After that the system matches the cow data against the sire catalogs, works through 26 traits per animal and writes the mating report. My own 400 cows: about half an hour. The 900 from the South Island: done before lunch.

And before that?

Months. I know, I did it. And at the end of those months there was always a quiet voice asking whether any of it was actually right. If you have 400 cows and try it yourself, you sit with it for months — and are you ever really satisfied with the answers you arrived at? That voice is quiet for the first time in my working life.

Seven kilograms, not thirty-five

What is the most important rule in your system?

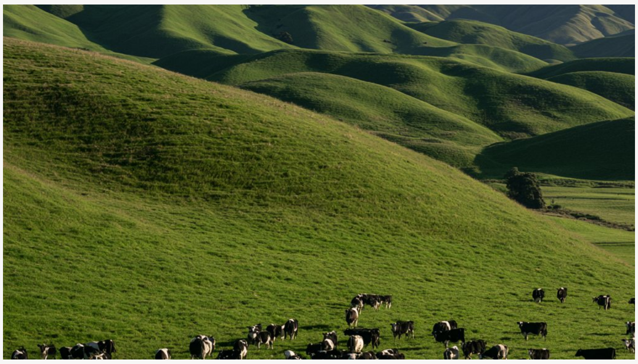
That you cannot go backwards with it. People come to me and say: I want bigger cows. Then we look at their data, their system, their location, how much feed they actually buy in. And we ask: will that really work on your farm? Most of the time the answer is no. Bigger cows do not automatically mean more milk in New Zealand. We farm outside.

And that turns into a number?

Seven kilograms of liveweight in one season (about 15 lb). Not thirty-five. Mating works in both directions — you can repair traits or reinforce them. But the system is built so that you do not go backwards. Anyone chasing thirty-five kilograms in one generation breaks something he did not know was load-bearing.

That sounds like the opposite of what you hear from vendors selling artificial intelligence.

We have exceptionally productive and valuable animals today. From calving to full lactation in six weeks, and then on, year after year, in our environment. We can no longer treat them like a bulk commodity. We have to make sure the data we get from her is right — because her progeny influence the next generation. And the one after that.



Waikato: grass, rhythm, and a system that keeps the record.

Checking the work backwards

The first progeny group from your own matings is out on grass. What did you do with it?

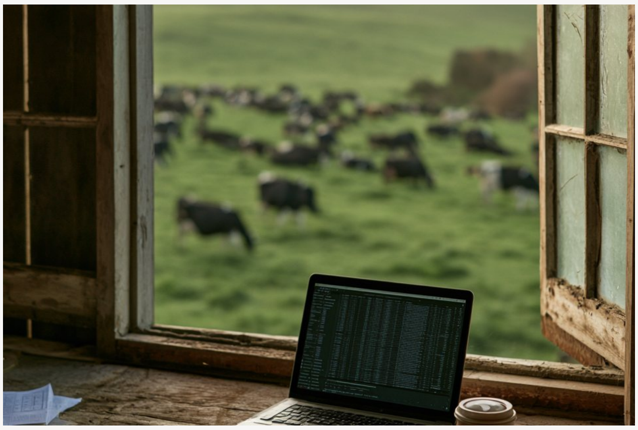
Something that would have been unthinkable two years ago. Before the calves went out to the grazing block, I pulled the genomic data on all of them, linked it to the full life history of each dam — size, maternal grandsire, lactation history, every health event, calving dates, first services, every case of mastitis, every lameness — matched the sire numbers and asked the system to tell me backwards how my mating program had actually worked.

How long?

Half an hour. And out came a verdict no human consultant could deliver in a month: this mating worked. This one was a failure. Not this sire again. This sire corrected a weakness that sat three generations deep on the dam side.

What do the numbers say?

Stay careful. The analysis of the farms working with our matings shows higher components and better fertility without a matching rise in milk volume. In a grazing system where every extra liter of feed costs money, that is the right combination. But the numbers that go through the trade press — 12 percent faster genetic gain, 18 percent fewer stillbirths — I treat with caution, and everyone should. Those are early figures. Whether they hold up to independent review, I do not know. The long-term traits, mastitis resistance and functional survival, will not tell their story for another five to eight years.



One file is enough — if it exists.

When the competition sat at the kitchen table

You are building a tool that competes with the national breeding organization's own mating program. How did they react?

You would expect lawyers. Instead an email came: the chief executive wanted to come out to the farm. He brought the whole leadership team — head of genetics, scientific lead, the technology people, the ones who write the MINDA dashboard themselves. They sat at my kitchen table.

And?

I said to one of them: you have spent your entire career on research and trials in genetics — I just did that in five minutes. That could have ended the conversation. It did not. They were excited. And then came the question I was not prepared for at all: what can we do to help? I am not a businessman. I am a dairy farmer who wants to breed the perfect cow.

What came of it?

They give me additional sire data and check the relationship of the proposed sire teams against the national pedigree database. That check is fast, accurate and sits on the national pedigree base — there would be no reason to rebuild it. Their own mating tool offered eight weightable traits. We work through 26.

What is your biggest risk?

Not the farmer and his breeding work. It is the separate platforms — the off-ramps from the genetics highway.

Putting it in context: what would work in Germany?

That last sentence is exactly why this conversation matters for German farms. What Matthew Zonderop does fails here not because of the technology, but because of three preconditions.

First: the file. The decisive advantage is not the model, it is the MINDA export — a standardized, downloadable file that holds everything on every animal. According to industry figures, the database covers about 93 percent of all dairy cattle in New Zealand. In Germany, genomic results reach the farmer mostly as individual PDF data sheets from the vit or Netrind system, one animal per file; for home-bred young sires, complete exports are in some cases not available at all. A farm with 300 genotyped animals has one spreadsheet there and 300 documents here. Anyone who wants to evaluate those documents spends most of his time not on breeding, but on retyping.

Second: the trait world. Zonderop works with BW, PW and TOP and bases the economic weighting on figures from DairyNZ. These values cannot be transferred to RZG, the German relative total merit index, or to the German sub-indexes; on top of that, both countries use different genetic bases and carry out base changes at different times. A model that does not know these differences compares numbers that have nothing to do with each other — and then states the result in flawless sentences. A faulty spreadsheet looks faulty. A faulty artificial intelligence answer looks like advice.

Third: the production system. The KiwiCross weighs around 450 kg (992 lb) and makes up about 60 percent of New Zealand's dairy cow population of roughly 5.91 million animals. It is a cross of Holstein-Friesian and Jersey, systematically selected since the 1950s. The farm calves in a block, and the culling threshold is hard and recurring. An index optimized for that has little in common with a German robot herd.

What can be transferred are three ways of thinking — and they cost nothing:

Set the weightings before choosing sires. Zonderop's twenty-minute goal-setting call before the first calculation is the real core of it. Anyone who starts with the sire list is answering a question he never asked.

Correct in increments instead of jumping. The seven-kilogram rule is not a New Zealand specialty, it is simply breeding discipline. It translates to any trait a German farm happens to be chasing.

Check backwards. Holding your own progeny up against the mating decisions you made four years ago is feasible here too, using milk recording and herd management data — and it is the only method you really learn from.

What remains is a demand as unspectacular as it is persistent: structured, machine-readable exports of a farm's own herd data, for every farm, at no extra cost. Not as a concession, but as a matter of course — it is the data of his animals. Whoever solves that will move more in the next five years than any new algorithm.

BOX 1

Profile

Matthew Zonderop, Matamata, Waikato, New Zealand. 50:50 sharemilker with about 400 KiwiCross cows: the farm owner provides the land, Zonderop provides the cows and the labor, and the milk income is shared — a form of farm business unknown in Germany that opens the path to farm ownership for many New Zealand farmers.

Founder of Perfect Cow Breeding Solutions. The system builds farm-specific mating plans at herd and individual animal level, calculated across 26 traits per animal. Data basis: the farm's MINDA export, the NZAEL RAS lists, the breeding values BW, PW and TOP, and economic figures from DairyNZ. The relationship check on the sire teams runs through LIC's national pedigree database.

Finalist in the Innovation Awards at Fieldays 2025.

BOX 2

New Zealand terms

MINDA — the national herd database of Livestock Improvement Corporation (LIC); according to industry figures it covers about 93 percent of all dairy cattle in New Zealand. The farmer exports a standardized CSV file from it himself.

BW — Breeding Worth — total merit index weighted by the expected economic contribution of the progeny in a grazing system.

PW — Production Worth — an assessment of an individual animal's performance to date, used as the basis for selection and culling decisions.

TOP — Traits Other than Production — conformation and functional traits.

RAS list — Ranking of Active Sires from NZAEL, the national sire ranking.

System 1 to 5 — a classification by feeding intensity, from all-grass with no bought-in feed through to partial TMR feeding.

KiwiCross — a cross of Holstein-Friesian and Jersey, systematically selected since the 1950s and protected as a breed by LIC in 2005. Around 450 kg, about 60 percent of the national dairy cow population of roughly 5.91 million animals.

Sharemilking — a farm business model in which the land and the herd belong to different parties and the milk income is split on an agreed share.

BOX 3

What is missing in Germany

	New Zealand	Germany
Data access	one standardized CSV from MINDA	individual PDF data sheets from vit/Netrind, one animal per file
Coverage	about 93 percent of all dairy cattle in one database	spread across breeding organization, regional milk recording body, herd program, milking equipment, veterinarian
Effort for 300 animals	one download	300 documents, to be merged by hand

The technical ability to evaluate whole herds with artificial intelligence exists on both sides. The difference is not the model, it is the access.

BOX 4

Three things all called “AI”

In dairy cattle breeding, AI has always meant artificial insemination. In this article it means artificial intelligence — the same two letters in English and, as KI, in German too, which is why this article spells the term out wherever it could be read either way. Within artificial intelligence, a distinction is worth making:

Statistical learning methods — the basis of genetic evaluation. Mature, validated, with published reliabilities.

Machine learning and neural networks — pattern recognition in images, sensor data and spectra. Partly ready for practice in trait recording.

Language models — they process text, bring sources together and explain relationships. Useful for preparation and advisory work, unsuitable for estimating breeding values, and prone to plausible-sounding errors without verification.

AI & BREEDING · TECHNICAL ARTICLE

Can artificial intelligence breed cattle?

Artificial intelligence in dairy cattle breeding: what it can do, what it looks like in practice, and how to get started

HELMUT DEMMELHUBER | MANAGEMENT CONSULTANT AND HOLSTEIN BREEDER

Cattle used to be bred on experience, a good eye and gut feeling. Then came performance recording, breeding values and genomics. Now a new tool is on the table: artificial intelligence. What it can do in practice — and what it cannot — is set out here from two vantage points, the barn and the data lab.

From the barn to the data lab — and back

Anyone who grew up in cattle breeding knows the craft in his bones: the smell of fresh hay, the stillness of a barn before the morning milking, the hours spent weighing up which sire suits which cow. For a long time that knowledge was inseparable from personal experience — intuitive, tested, handed down from one generation to the next.

Today a new tool has joined it: artificial intelligence.

The author of this article grew up on a Bavarian dairy farm with about 50 registered Holstein cows. Breeding was daily life: up at four, milking, feeding, calving assistance, planning matings. At 15, after his father's serious accident, he took on breeding responsibility early. By the time he finished high school, the family had to give up the herd. The passion stayed. He studied theology and education in Passau, Freiburg, Israel and the United States. He worked in South Africa, in India, all over the world — but never out of touch with Holstein breeding.

In February 2025 he came back to Holstein breeding in earnest, buying two breeding heifer calves at the MASTERRIND Exclusive sale in Verden — MASTERRIND is a German breeding cooperative — together with breeders Volker and Timo Carstens of Visselhövede.

> Now the cow fever has really got you, Volker Carstens said at the time, laughing. He was right.

The particular push toward artificial intelligence came a little earlier. A client reported that using ChatGPT was saving him roughly 40 percent of his working time. That sentence was the wake-up call. This time the author did not want to do what he had done with the PC and the smartphone — wait until a technology was long established before getting on board. He wanted to understand early what was actually possible.

That double perspective — breeding practice on one side, digital transformation on the other — is the basis of this article.

What artificial intelligence can do today — and what it cannot

Most people so far use artificial intelligence mainly to write emails or text. That is useful, but in breeding it is a very small slice of what is possible. On farms, artificial intelligence is strongest where there is a lot of structured data and where the sheer volume puts people up against their limits. Genomic data, performance data, pedigree information, breeding values — these are classic fields in which artificial intelligence can work through relationships that are barely manageable by hand.

What it cannot do is be there in the barn. It does not see an animal. It does not feel temperament. It does not know a farm's particular history, a family's personal breeding goals, or what the market will be asking for next year. Artificial intelligence is a powerful analytical tool — not a replacement for an experienced breeder.

Artificial intelligence does not replace a breeder — but it makes him considerably stronger.

Three applications with real value

Three examples from practice in which artificial intelligence can genuinely support a breeder and take work off his hands:

1. Breeding plans and mating decisions

Sire selection is one of the most frequent and most consequential decisions in day-to-day breeding. Genomic data, growing sire lineups and increasingly differentiated breeding goals make that choice steadily more complex. Anyone mating several dozen cows today is looking at hundreds of proven or genomically evaluated sires, each with its own strengths in type, udder, feet and legs, health traits and production.

This is where artificial intelligence can bring structure. The genomic profile of a cow is analyzed, the weaknesses identified are matched against the sires actually available — from the farm's own semen tank, say, or from the current lineup of an artificial insemination organization. The result is a reasoned, ranked selection of two or three suitable sires, with a short explanation of why the combination makes sense.

One point matters here: this is not about replacing the breeder's judgment, it is about a structured second opinion. In larger herds in particular, or in complex embryo transfer programs, the approach can help reach decisions faster and more systematically without overlooking something essential. Inbreeding and outcross management can be steered better the same way.

For embryo transfer programs it goes further still. Artificial intelligence develops a complete rotation strategy for the OPU and embryo transfer use of a top female — first several flushes with very high total merit values, then targeted corrective sires, and after that phases for special traits such as polled, red factor or slick. One result was particularly telling: a sire the breeder himself was fond of was clearly ruled out, with sound breeding reasoning that was fully transparent.

The machine calculates. The decision is made at the table.

2. Herd analysis and breeding strategy

Where an individual mating is a classic operational problem, the herd level is about something else: strategic development across several generations.

Artificial intelligence can help evaluate the genomic data of a whole herd systematically and build a differentiated profile of strengths and weaknesses. It often turns out that certain traits cluster — not by chance, but as a consequence of earlier breeding decisions. Feet and legs, udder health or fertility may have been improved or stabilized deliberately over several generations — but they may also have drifted the wrong way without anyone intending it.

In practice: on the Carstens farm the complete genomic herd data were evaluated. Artificial intelligence produced a clear strengths-and-weaknesses analysis and identified the areas to work on. From that, a precise breeding strategy was defined — including first-, second- and third-choice sire recommendations for each animal, in a form that works in the barn every day.

An analysis like that answers the central strategic questions. Where are the herd's genetic strengths? Which weaknesses keep recurring? How is the herd's level of inbreeding developing? Which traits should be improved deliberately over the coming years? Artificial intelligence can simulate different breeding strategies and show their likely effect on how the herd develops.

For farms that have not been able to draw on regular breeding advice, this opens up analytical capacity that used to be almost out of reach.

3. Type evaluation from photographs

One particularly promising application is image analysis of animal photographs. Modern image recognition systems can take high-quality shots — taken to a standard from defined angles — and derive indications of body structure, leg set, rump angle and udder attachment.

Early tests show surprisingly precise results: on linear scoring from photographs, the deviation from the actual classification score was usually no more than one point, depending on image quality and angle. That makes it possible, for instance, to supplement the Triple-A system — an established method of assessing the morphology of breeding animals — with a preliminary evaluation from artificial intelligence, above all in combination with genomic profiles.

None of this replaces an experienced judge or breeding advisor. The human eye — which sees an animal move, reads how it stands, senses the tension in its body — remains irreplaceable. But artificial intelligence can help make assessments more objective, put a bad day into perspective and add another point of view. That is especially useful for farms without regular access to a breeding advisor.

Tools and data

Technically, a breeder interested in working with artificial intelligence has a range of mature systems available. In practical work these are mostly large language models: ChatGPT (OpenAI), Gemini (Google), Claude (Anthropic) and Perplexity are among the most widely used platforms. NotebookLM (Google) adds interesting options for structured analysis of longer documents — breeding reports or herd statistics, for example.

The analyses draw on data sources including the following:

Genomic breeding values for individual animals

Pedigree information and ancestry data

Technical articles, interviews and publicly available technical information

The author's own experience from breeding and consulting work

Artificial intelligence does not work unsupervised here. It works under control, in a structured way, and embedded in technical judgment. What matters is not the individual tool but that the system is used reliably, transparently and alongside professional experience. The value appears where data, experience and practical logic come together.

The quality of the results depends heavily on the quality of the questions. Feed artificial intelligence blanket questions and you get blanket answers. Ask precise, context-rich questions and supply the relevant data, and the quality of the support rises markedly. The technical term for this is prompt engineering — the art of addressing an artificial intelligence system so that it actually delivers what it is capable of.

A practical guide: sire selection in five minutes

The following sequence shows how artificial-intelligence-supported sire selection fits into the working day. Two documents are needed: the cow's genomic data from the vit/Netrind system — the German dairy genetic evaluation and herd data systems — as a PDF, and the current sires in the semen tank, likewise as PDFs.

Step 1: open a chat and enter the prompt

Paste the following opening prompt straight into ChatGPT or a comparable system:

“You are a professional sire analyst for Holstein cattle and you advise on matings on the basis of the uploaded PDF data. Please analyze the animal with the genomic data attached in the first PDF and compare it with the sires from the further PDFs (sires currently in the semen tank). Always apply our defined breeding goal: economical Holstein cows with high lifetime production and functional type, producing at least 12,000 kg of milk a year (about 26,500 lb) at ≥ 4.0% fat and ≥ 3.4% protein. Healthy udders, sound feet and legs and good fertility secure a long productive life. Inbreeding is to be avoided. Use only the sires contained in the uploaded PDF files. Do not use any other data, lists or internet sources. If a sire is not in the sire PDF, it must not be proposed. Please suggest 3 suitable sires from the semen tank for mating with this animal — ranked, with a short justification and a note on which of the animal's weak points the mating corrects. Then also produce a short matrix (traffic-light scheme) showing which of the animal's weaknesses each sire corrects and which traits remain neutral or carry risk.”

Step 2: photograph the data sheets and/or upload the PDFs

Load the cow PDF and the sire PDF or PDFs into the chat.

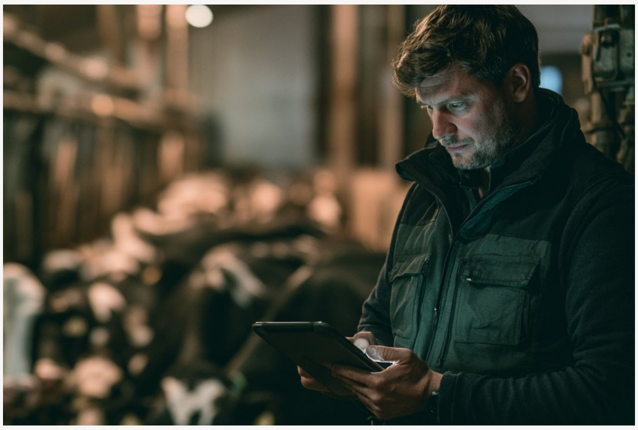
Step 3: read the result and decide

The system returns a ranked list of recommended sires with reasoning, plus a traffic-light matrix showing which of the cow's weaknesses each sire corrects. Normally: take the first-ranked sire. If he is not available, take the next best.

Tip: instead of the PDFs you can simply photograph the prompt and the genomic data sheets from the printout and/or the screen and upload those.

Or use the free artificial intelligence tools the author has built:

https://www.dairytalk.info/KI-tools



A model does not make visible what stands in the dark.

Opportunities and clear limits

What this opens up for farms

Analytical capability that used to be the preserve of specialized advisory structures is now within easier reach of the individual farm. That does not make professional breeding advice redundant — quite the opposite. But it does mean a breeder can come to a conversation with his advisor better prepared, bring his data in more structured form, and question recommendations more critically.

Keeping the limits clearly in view

The danger lies in relying on algorithms blindly. Without technical knowledge, critical judgment and accountability, artificial intelligence can amplify a wrong turn. It remains a tool — what decides the outcome is the attitude, the competence and the integrity of the people using it.

Getting started without fear of the technology

Nobody has to be a technology expert to use artificial intelligence sensibly. The advice is deliberately simple:

Set up an account with a trustworthy artificial intelligence system — ChatGPT or Gemini, for example.

Start small, with concrete questions out of your own barn and your own business.

Talk to it the way you would talk to a person.

Work your way into prompting step by step — and let someone help you.

Do not take answers on trust: compare them, sharpen them, ask follow-up questions.

Use the exchange with colleagues, and take the training on offer.

Stay confident: you cannot break anything with artificial intelligence — but you can think a great deal more clearly.

The best way in is with concrete questions out of your own working day. Export your herd data to a spreadsheet, hand it to an artificial intelligence system with a clear question, and you will quickly see what kind of analysis becomes possible. It works best where experience, gut feeling and data come together.

Practical tip: the four-step prompt formula for a high-quality prompt:

1. Who am I? — the P e r s o n

In what role or function am I addressing the system?

e.g. employee, manager, project lead What matters: the perspective I am working from

2. What is this actually about? — the C o n t e x t

What situation am I in?

Organization, farm, project, audience Conditions, particularities, goal or problem

3. What exactly should happen? — the T a s k

What exactly do I want the system to do?

analyze, structure, explain, compare, draft desired format (list, table, text, guide)

4. How should it think? — its R o l e

In what role should it answer?

e.g. neutral analyst, experienced consultant, sparring partner technical, pragmatic, critical, clear

An example of a four-step prompt:

"I am a dairy farmer and I make management decisions for my farm (person). My farm keeps about 150 cows and works with milking robots (context). Suggest 5 concrete measures to improve fertility management and give a short reason for each (task). Answer as an experienced, practical consultant for fertility and herd management — technically sound and easy to follow (role)."

Conclusion: people, experience and artificial intelligence together

Cattle breeding has always been a combination of technical knowledge, experience and passion. Those three elements are the foundation, and that will not change.

Artificial intelligence adds a new tool to that foundation: one that makes complex volumes of data manageable, gives structure to decisions, opens up new perspectives and provides analytical capacity that was previously hard to reach. Treat it as a sparring partner rather than an autopilot and you will benefit from it.

The decisive difference is one of attitude. Breeding decisions supported by artificial intelligence are not automated decisions. They are better-informed decisions — made by people who have more information, more clearly structured, than before. Responsibility for breeding decisions still rests with the human being.

The future of cattle breeding does not lie in technology alone. It lies in the interplay of breeding instinct, decades of experience and the ability to use new tools intelligently. Master that interplay and you will have a real competitive advantage — not because you have more data, but because you draw better decisions from it.

Together you are stronger: people + experience + artificial intelligence.

AI & BREEDING · METHOD

No farm is average

Herdenanalyse 360°, Flexi-Herdenindex° and Flexi-Mating° — the tools behind a farm-specific Breeding Planning 360°

HELMUT DEMMELHUBER | MANAGEMENT CONSULTANT AND HOLSTEIN BREEDER

Herdenanalyse 360°, Flexi-Herdenindex° and Flexi-Mating° are three artificial intelligence tools that build on one another to produce a farm-specific Breeding Planning 360°. They answer three questions in a fixed order: where does this herd stand? Which animals fit its goal? And which sire fits which cow? So far they have been used and developed with five dairy farms — Holstein, Red Holstein and Fleckvieh (German Simmental), 150 to 700 head, with and without genomic data, with milking robots and with a parlor. This article describes how the tools work, what they deliver, what they cannot do, and how a farm can try them for itself.

Herdenanalyse 360°, Flexi-Herdenindex° and Flexi-Mating° – the artificial intelligence tools behind a farm-specific Breeding Planning 360°

How the tools came about

This did not start as a software project. It started with a practical question.

A good two years ago a client told me at a seminar that artificial intelligence was saving him about forty percent of his working time. At that moment I made a decision: I did not want to be a late adopter again. So I started teaching myself.

At about the same time, after many years, I bought two breeding heifers — two Holstein calves, together with a farmer friend near Bremen. That put a very concrete question on the table: what are these animals actually worth? So the first attempt was not a mating, it was a market valuation based on pedigree and auction comparisons. The result was considerably better than I had expected.

The first real breeding question came from the young woman farming that operation: "Could artificial intelligence help us pick the right sire when my husband isn't home?"

Out of that came the first prompt — a brief of the kind a sire analyst would write. Analyze this female on the basis of the uploaded breeding values. Compare her only with the sires in this semen inventory. Name the biggest weakness to be corrected. Propose three sires in rank order, with a reason for each, a traffic light for each trait, and an honest note wherever a requirement is not met. Even that first attempt contained two rules that still hold today: no external data and no estimated values.

After that it moved quickly — from the second prompt to full breeding reports, to purpose-built applications, to the first pilot farms.

And then came the wall. A procedure like this is only as good as the data it is given. Structured access to breeding data did not exist. Everything had to be assembled by hand: from catalogs, from screenshots, from PDF files in every imaginable format. Without a dependable data basis there is no learning — and without learning there is no meaningful mating optimization.

It does not start with the number. It starts with the question.

The breakthrough came through a contact in New Zealand.

In an article on the trade portal The Bullvine I came across Matthew Zonderop, a dairy farmer in the Waikato with about 400 KiwiCross cows. He had built an artificial-intelligence-supported mating system on his own — not with an off-the-shelf program, but with data from his own herd out of MINDA, the New Zealand herd management system. That first contact turned into a technical exchange that continues to this day.

What mattered was less any single idea than the confirmation of a principle: make your own herd data properly available and you can do breeding work with it, without waiting for a finished product. That is exactly where the development turned. Individual questions to a language model became a data extraction routine for PDF documents, that became an independent data basis — and that finally became a chain that runs from the breeding goal through to the breeding plan, instead of starting from scratch with every question. A second independent case, different tools, the same principle.

By his own account, the genomic total merit level of his herd is now well above the national average, and more than half of the current calf crop comes from the best quarter of his cows. His comment on it — that it is no accident which animals get selected — describes precisely the difference this is about.

The tools this article describes grew out of that sequence: a practical question, an attempt, a wall, an exchange — and after that, so far, five farms that have put the whole thing to the test. Further farms have already come forward wanting these artificial intelligence tools applied in their own herds.

A procedure like this is only as good as the data it is given.

Why the order is what matters

In practice, breeding planning almost always starts with the question: which sire do I use next on which cow? That is understandable, because it is the only one of the three questions that leads straight to a decision. It is simply the third question, not the first.

Two others come before it. Where does my herd actually stand? And where should it be going? Start at step three and you are optimizing toward a goal nobody has examined. That is precisely why the three tools build on one another: each one produces the basis for the next.

The starting problem is rarely a lack of information. An average dairy farm today holds more data about its animals than ever before — milk recording, breeding values, pedigrees, insemination records, robot or herd management data, hoof trimming records, and increasingly genomic results. The data simply sit side by side instead of together. The breeding value is in the association portal, the milking data are in the robot, the culling reasons are in the herd program. Each source describes one slice of the same cow. The tools address exactly that gap.

The sequence: from farm data to a breeding plan

Before the individual tools, here is the practical sequence of a Breeding Planning 360° as it was carried out on the pilot farms.

Step 0 – handing over the data. The farm pulls together what it already has: MLP data — MLP (Milchleistungsprüfung) is the German milk recording scheme — breeding values, pedigrees, reports from the robot or herd program, and where possible the culling reasons for several years. In practice this takes a few hours.

Step 1 – Herdenanalyse 360°. The sober assessment of where things stand: strengths, limiting factors, culling pattern, relationship structure.

Step 2 – Flexi-Herdenindex°. Out of the analysis and a structured conversation comes a measurable breeding goal for the farm. Trait weightings, must-have criteria, exclusions, replacement requirement. Cows, heifers and sires are then ranked against that goal — not against the breed's goal.

Step 3 – Flexi-Mating°. For every cow, a reasoned mating proposal with alternatives.

What comes out at the end is not a data sheet but a breeding plan — and a consolidated data basis for the herd that for many farms is the first of its kind.

01

TOOL

Herdenanalyse 360°

Goal: an honest stocktaking before any recommendation is made.

Fig. 1: Herdenanalyse 360° – interactive dashboard of a sample farm. Key figures, RZG distribution, trade-off spread and herd profile all draw on the same verified data basis; the navigation on the left runs from the herd overview through to selection, weak points and reports. RZG is the German relative total merit index. Anonymized sample data.

The herd analysis brings together what is known about the individual cow — in practice six to eight sources that have never before appeared together in one table. Depending on what data exist, it looks at production and lifetime production, functional traits such as fertility, health and productive life, type and suitability for the milking system in place, the genetic structure with cow families, sire lines and degree of relationship, and the culling pattern.

What the farm gets back: a picture at a glance, as a written evaluation report and as an interactive dashboard — level, greatest strength, greatest weakness; a trait-by-trait comparison against the farm's own must-have values; three to five concrete genetic levers for this farm; and a picture of the inbreeding situation with risk areas and line concentration (Fig. 1).

One principle runs through it: every statement carries a confidence level. What is documented is called documented. What was calculated is called calculated. What the data do not support is marked as open — not sold as a finding. Missing values appear as a dash and are never estimated. No partial group is treated as the whole herd.

From the pilot farms: one Fleckvieh farm had documented the culling of 668 cows over thirteen years — not scientifically, partly in free text and dialect, but over a long period. The farm manager assumed the main breeding issue was feet and legs. The systematic evaluation pointed more strongly toward the udder and toward how well individual cows suited the milking system in place. The most revealing entries were the unremarkable ones, such as "otherwise a good cow." When a fundamentally productive cow has to go because individual traits do not fit the production system, that changes a breeding goal.

In another analysis, certain problems appeared to cluster in particular cow families. In breeding terms that would have been highly interesting. The statistical check showed the cluster could also have arisen by chance — and therefore could not be allowed to become the basis of a breeding decision. Both results belong together: one shows what an analysis can do, the other where it has to stay silent.

The benefit: for the first time the farm gets a consolidated, data-based view of what its herd's strengths and weaknesses are — not by feel, but from its own records. Only once the facts have been named is it possible to judge what should be tackled through breeding, through feeding or through management. All three routes cost different amounts.

02

TOOL

Flexi-Herdenindex°

Goal: a ranking that reflects this farm's breeding goal — not the breed's.

ABB. 2 · FLEXI-HERDENINDEX°

Dieselbe Bullenliste, zwei Rangfolgen

Neun Bullen aus einem Bullenpool – links nach dem offiziellen Gesamtzuchtwert, rechts nach dem Zuchtziel eines Musterbetriebs.

Standard-Rangierung

sortiert nach RZG

Rang	Bulle	RZG
1	Bulle A	155
2	Bulle B	152
3	Bulle C	152
4	Bulle D	150
5	**Bulle E**	**149**
6	Bulle F	148
7	Bulle G	146
8	Bulle H	140
9	*Bulle I*	*anderes System*

Flexi-Herdenindex°

Gewichtung des Betriebs: RZR 22 % · RZS 18 % · RZM 15 % · MVH 12 % · RZN 10 % · RZG 8 %

Rang	Bulle	Score
1	Bulle A	123,1
2 ▲	**Bulle E**	**120,8**
3	Bulle D	118,6
4	Bulle C	118,6
5	Bulle F	117,4
6	Bulle B	116,7
7	Bulle G	rd. 115
8	Bulle H	rd. 111
–	*Bulle I*	*Muss-Kriterium verfehlt*

Warum Bulle E aufsteigt – seine Zuchtwerte im Kontext dieses Betriebs

Merkmal	Bulle E	Herde Ø	Zielwert Betrieb	Gewicht
RZR – Fruchtbarkeit	**117**	**107,6**	**≥ 108**	**22 %**
MVH – Melkbarkeit / Roboter	**111**	**103,5**	**≥ 110**	**12 %**
RZN – Nutzungsdauer	124	112,3	≥ 110	10 %
RZ Gesundheit	115	106,7	≥ 105	5 %
RZG – Gesamtzuchtwert	149	120,1	≥ 145	nur 8 %
Fundament	113	–	–	ohne Abzug

Bulle E ist in der RZG-Rangierung ein Mittelfeldbulle. Für **diesen** Betrieb liegt er auf Rang 2 – weil dessen begrenzende Faktoren Fruchtbarkeit und Melkbarkeit sind und der Gesamtzuchtwert hier nur mit 8 % eingeht. Die Zuchtwerte des Bullen haben sich nicht verändert. Die Frage hat sich verändert.
Anonymisierte Musterdaten. Der Flexi-Herdenindex° ersetzt keinen offiziellen Zuchtwert.

Fig. 2: the same sire list, two rank orders. Sire E ranks 5th on RZG — and 2nd on this farm's weighting. The breeding values did not change. The question did.

Official total merit indexes such as RZG, GZW or TPI bundle many traits into one defined breeding goal and make selection across a whole population possible. That weighting is built for the breed. A robot-milking farm with tight heifer-rearing capacity and a parlor farm selling breeding stock need different cows — but they get the same ranking.

The Flexi-Herdenindex° does not replace any official breeding value and does not change one. It takes the breeding values that exist and weights them according to what the farm actually needs. Must-have criteria act as a filter ahead of the ranking, not as a weighting inside it: a sire that misses a basic requirement never appears at all. It is not an animal's genetics that change — what changes is its significance for this farm.

It applies to three groups of animals: to the farm's own cows, when deciding which animals should shape the next generation; to the farm's own heifers, when rearing places are to be used profitably; and to sire lists for use in the farm's own herd, whatever the supplier.

From the pilot farms: on one farm there was a very highly rated sire in the semen tank. On a conventional ranking, using him more heavily would have been the obvious move. But for the trait the herd analysis had identified as particularly relevant, he did not deliver the improvement wanted. Other sires fit better. That did not make him a bad sire — they were two different questions.

Two rankings of the same herd differ considerably depending on whether they are sorted by total merit index or by what the farm needs. On the pilot farms, of the twenty top-ranked animals in each case, often only a few appeared on both lists (Fig. 2).

A further check produced what is perhaps the most surprising result of the work so far. The breeding values that, by their name, should have been responsible for a farm's main problem predicted nothing there. Two entirely different traits did — statistically confirmed, and verified against a control. A breeding value is not automatically responsible for a problem just because of what it is called.

The benefit: the farm selects for the traits that demonstrably work in its own herd — instead of the ones that ought to fit by name. Where rearing places are tight, that pays off immediately: every place one animal occupies is no longer available to another.

03

TOOL

Flexi-Mating°

Goal: the right sire for each individual cow, without losing sight of the herd goal.

ABB. 3 · FLEXI-MATING°

Auszug aus einer Anpaarungsempfehlung

Je Kuh drei rangierte Vorschläge – mit Begründung, ausgewiesenem Kompromiss und Inzuchtprüfung für genau diese Paarung.

Musterbetrieb · Zuchtziel: funktional / robotertauglich · Reihenfolge: Betriebsprofil → Zuchtziel → Bullenauswahl → Anpaarung · Drei harte Ausschlüsse: Spermatyp, Defektträger, scharfe Inzucht – alles Übrige wird abgewogen

Kuh	Kategorie	Abzusichernde Schwäche	1. Wahl	Warum dieser Bulle	Erfüllt nicht / Kompromiss	2. Wahl	3. Wahl	Inzucht (1. Wahl)
ZUCHTSPITZE · gesext + ET								
Kuh 192 RZG 142 · RZD 91	Zuchtspitze	Melkbarkeit / Roboter	**Bulle E**	Korrigiert Melkbarkeit und Robotertauglichkeit; stark in Nutzungsdauer (RZD 115) und Fruchtbarkeit (RZR 117) – beides Zielmerkmale des Betriebs	—	Bulle B	Bulle D	● 2,1 % · grün
Kuh 180 RZG 141 · RZD –	Zuchtspitze	—	**Bulle A**	Höchster Gesamtfortschritt im Pool; stark in Zellzahl (RZS 126) und Nutzungsdauer (RZN 128)	Fundament unter dem Zielwert des Betriebs (102 statt ≥ 108) – bewusster Kompromiss, da die Kuh hier selbst stark ist	Bulle E	Bulle C	● 1,6 % · grün
ELITE-NACHZUCHT · gesext								
Kuh 103 RZG 139 · RZD 94	Elite-Nachzucht	Melkbarkeit / Roboter	**Bulle E**	Gleiche Korrektur wie oben; Einsatzlimit des Bullen im Betrieb noch nicht ausgeschöpft	—	Bulle B	Bulle D	● 2,4 % · grün
Kuh 140 RZG 136 · RZD 93	Elite-Nachzucht	Eutergesundheit	**Bulle A**	Deutlichste Verbesserung der Zellzahl im verfügbaren Pool (RZS 126 gegenüber 108 der Kuh)	Fundament unter Zielwert; Fruchtbarkeit nur auf Herdenniveau	Bulle C	Bulle F	● 4,8 % · gelb – prüfen
GEBRAUCHSKREUZUNG · gedeckelt auf den berechneten Nachzuchtbedarf								
Kuh 217 RZG 96 · RZD 88	Gebrauchs-kreuzung	— (keine Nachzucht vorgesehen)	**Fleischrasse**	Kuh trägt nicht zur Remonte bei; Anteil bleibt innerhalb des berechneten Limits von 35 %	—	—	—	nicht relevant

Anonymisierte Musterdaten. Jede Kuh erhält mehrere rangierte Vorschläge – nie nur einen Namen und nie die Antwort, es gebe keinen passenden Bullen. Der Fleischsperma-Anteil wird gegen den tatsächlichen Nachzuchtbedarf des Betriebs gerechnet, bevor besamt wird.

Fig. 3: extract from a mating recommendation — three ranked proposals per cow with reasoning, the trade-off stated, and an inbreeding check for that exact pairing.

Every cow is looked at individually: what does she lack, what does she bring, and who is she related to? For every cow-sire combination the system checks the inbreeding coefficient, genetic defects and genetic particularities, that cow's specific strengths and weaknesses, and the farm's requirements on semen type and replacement needs.

Two rules are built in permanently. Every cow gets several ranked proposals with reasoning — never just one name, and never the answer that no suitable sire exists. And a usage limit per sire, set by the farm, caps the concentration of individual lines (Fig. 3).

That second rule has a concrete origin. On one Red Holstein farm the requirements of the breeding goal had been translated into hard exclusion thresholds so consistently that on the first run no suitable sire was left for 96 of 101 cows. Mathematically explicable, worthless to the farm. Today a strict distinction is made between genuine exclusion criteria — wrong semen type, carrier conflict, inbreeding coefficient too high — and traits where a trade-off is weighed.

What a sire's name does not tell you: on one pilot farm certain combinations looked entirely unremarkable — different names, apparently enough distance between the lines. Only a comparison of the ancestors revealed closer common descent. The ten most frequent ancestors there accounted between them for more than forty percent of the gene pool. Relationship analysis is therefore a fixed part of the mating logic and not an optional extra: an unwanted rise in inbreeding cannot be taken back in the next generation.

Born out of practice: one farmer objected that with too high a share of beef semen he would have no replacements in two years. He was right. Today the actual replacement requirement is calculated and the beef semen share is capped before any cow is bred.

The benefit: the assignment is backed by reasoning that can be followed and explained in the barn — to employees as much as to the AI technician. A recommendation that says what is to be improved, which strength has to be preserved and where the compromise lies can be examined on its merits and rejected with reasons. A sire's name on its own cannot do that.

The mathematically perfect solution is worthless if it does not work in the barn.

Three tools that build on one another.

What links the three tools

The real difference from stand-alone evaluations lies not in the tools themselves but in how they connect. Each step hands its result to the next in structured form: the trait weightings, the must-have thresholds, the areas to improve, the replacement requirement. Nothing is retyped, nothing is entered twice. From the breeding goal down to the individual cow-sire combination it stays traceable why a proposal looks the way it does.

Just as important is keeping the levels apart. Weighting, standardization and ranking are calculated deterministically and reproducibly — not generated in language. Relative values and absolute values are treated differently; adding them together naively would be technically wrong. Sires from different breeding systems are evaluated separately and flagged as converted, never mixed into one common ranking. That is the practical difference between systematic breeding planning and asking a chatbot: “Which sire would you take?”

Artificial intelligence has a clear and limited role in this. It helps bring together large and very different bodies of data, make relationships visible and present results in a form people can follow. It does not know the farm first-hand, it carries no responsibility, and it must not declare a hypothesis a finding merely because it sounds plausible. The data describe the herd. The computational models structure and compare. The breeder decides.

What the pilot farms have shown — and what is still open

On four of five farms the analysis produced at least one finding nobody had expected. On one farm the result of the sire selection was that the semen inventory on hand largely covered the coming requirement and there was a gap in only one area — no long shopping list was needed. In nearly every analysis, moreover, the first thing to appear was a set of strengths the farm manager was not aware of, and which can quietly be lost while optimizing some other trait.

Just as often it was not the farm that had to rethink but the computational logic that had to change. One breeder considered an exclusion rule too severe — it would have screened out sires she knew from experience to be suitable. She was right; the hard minimum requirement became a target corridor with an upper limit. Another breeder warned that optimizing too hard would produce an ever more uniform herd. That was also correct: one rule favored broadly usable sires so strongly that it screened out exactly the specialists who could have corrected a particular weakness. It was replaced. One farm manager merely asked where a figure came from — and in doing so exposed a link built on animal names instead of ear tag numbers. Since then everything is linked through the lifetime animal ID alone.

Being honest about it means saying what is not yet proven.

The first calves mated under this procedure have not yet been born. Five farms and the observation period so far are not enough for a dependable statement about additional genetic progress. That is why what was expected is documented from the outset — otherwise there is nothing to compare against later. The next development step is validation against larger real-world data sets. With artificial intelligence applications in animal breeding in particular, professional seriousness means distinguishing between what works today and what still has to be demonstrated.

It is not the algorithm that decides whether the procedure holds up. The cows show that.

Five farms, five starting points: structure beats template.

Which farms this is worth it for

Breeding Planning 360° is not aimed only at farms with an obvious problem. The approach is interesting anywhere the data that exist, the breeding goals and the actual decisions are to be tied together more tightly. Three starting positions can be distinguished from the analyses so far.

First: open questions in the herd. Cows leave earlier than wanted and the causes are not clear-cut. More heifers are reared than are needed in the long run. Or it is unclear which animals should particularly shape the next generation. That is the obvious occasion — and the one where a farm's own data most often surprise it. The Fleckvieh farm with the 668 documented cullings was looking for its main issue somewhere other than where its own records located it.

Second: changes on the farm. Moving to an automatic milking system, a planned expansion, rearing places getting tighter, a higher share of sexed semen or of beef breed matings, a reorientation of the breeding goal. Changes like these shift what is asked of the cow — and with it the question of which genetics will fit the farm in future. Breeding works slowly: notice only after the rebuild that your breeding goal is still the old one and you have lost a generation.

Third: systematic development. Herds in which many sires and lines have been used over the years and in which pedigree, relationship, genetic concentration and the semen inventory on hand are to be looked at together for once — particularly where genetics from different suppliers or breeding systems are used. And explicitly also farms that are already in good shape genetically. Not every analysis has to find a weakness. It can confirm that a strategy is working, and it can name strengths the farm manager was not aware of — in almost every pilot analysis that was exactly the case. Know those strengths and you can preserve them deliberately at the next selection decision, instead of quietly losing them while optimizing something else.

Across all three starting positions, the same questions stand at the end:

- What actually characterizes my economically and functionally best cows?
- Which animals should shape the next generation — and which heifers do I keep when places get tight?
- Which traits limit my herd, and can they be influenced through breeding at all?
- Do the sires I am using today fit my farm's breeding goal — and does my semen inventory cover the coming requirement?
- How broad is my genetic base, and where do relationship risks arise?
- Which cow will my farm need in five or ten years?

Not every farm needs the same scope for that. The analysis follows the question asked and the data actually available. A fully genotyped herd opens up options that a herd with mainly production, pedigree and culling data does not. Both can be evaluated.

The decisive point is therefore not whether a farm has a problem. It is whether it wants to put its breeding decisions on a clearer, farm-specific footing.

More pilot farms wanted

After the first five herds the work moves into its next phase. More dairy farms are wanted, and explicitly across breeds: alongside Holstein, Red Holstein and German Fleckvieh, Brown Swiss and Jersey herds are equally welcome.

What is wanted is ordinary farms with different starting positions, breeding goals, sizes and data situations: farms with and without herd-wide genomics, robot-milking farms as well as conventional milking systems, breeding-oriented herds as well as straightforward production farms. A farm without a single genotyped cow was one of the most demanding cases in the work so far — and it could still be evaluated, because realized production data, milking system data, pedigrees and culling records carried the gap.

The farm receives a complete analysis of its herd, a farm-specific breeding goal, its own ranking and concrete mating proposals — along with the tools to carry on by itself afterward. In return, its feedback goes straight into further development. That is how every substantial improvement so far has come about.

A first conversation serves only to clarify the question and the data available. Before anyone talks about sires.

THE THREE TOOLS AT A GLANCE

Herdenanalyse 360° – where the herd stands

Where does the herd really stand? Which strengths have to be preserved, which factors limit it, and which of those can be influenced through breeding?

Basis: MLP, breeding values, pedigree, milking system and herd management data, culling pattern, genomic data and anything else available.

Flexi-Herdenindex° – setting the goal and ranking

Which animals and which genetics fit this farm's breeding goal? Farm-specific weighting based on the defined herd breeding goal and the official breeding values, with must-have criteria as an upstream filter.

Applies to: the farm's own cows, the farm's own heifers, sire lists whatever the supplier.

Flexi-Mating° – the individual mating

Which sire fits which cow — and why? Several ranked proposals per cow with reasoning, an inbreeding check for each pairing, a farm usage limit per sire.

Takes into account: cow profile, herd goal, relationship, genetic defects, semen type, replacement requirement.

Independent of supplier and breeding organization.

More information: www.dairytalk.info/zuchtplanung-360

SOURCES (SELECTION)

ICAR (International Committee for Animal Recording): Guidelines for dairy cattle recording and Section on Functional Traits.

vit Verden: Zuchtwertschätzung Milchrinder – methodological description and current evaluation results (German dairy genetic evaluation).

ZAR/ZuchtData: Zuchtwertschätzung Fleckvieh – total merit index and sub-indexes (Fleckvieh genetic evaluation for Germany and Austria).

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Wright, S.: Coefficients of inbreeding and relationship – methodological basis of the relationship calculation.

Practical basis: analyses and experience from the author's consulting practice, 2026.

AI & BREEDING · DATA RIGHTS

My animals – my data?

Data sovereignty in modern cattle breeding – between the EU Data Act, cooperative principles and the question of who decides about the most valuable resource of the future

HELMUT DEMMELHUBER | MANAGEMENT CONSULTANT AND HOLSTEIN BREEDER

Our cows no longer produce only milk. They produce data. Every calving, every insemination, every test day, every genomic test, every activity reading, every hoof treatment — all of it leaves digital traces that are steadily turning into economic value. Whoever controls those data controls a substantial part of the future of cattle breeding. And that is exactly why the question of who gets to decide how those data are used stopped being a technical question long ago. It is strategic, it is legal, and at its core it is a question about what a cooperative is for.

1. The cow becomes a data generator

A cow's breeding record used to consist of a few handwritten entries: pedigree, calving date, milk yield. Today a single animal can have thousands of data points stored against it — from the tissue sample taken at birth, through daily sensor readings at the milking robot, to a genomic evaluation based on several hundred thousand SNP markers.

That density is not a fringe phenomenon. It is the result of a technological transformation that has reached every part of dairy farming over the past ten years: genomics, precision farming, automated milking and feeding systems, hoof sensors, activity monitoring, heat detection, health monitoring. Every one of those technologies generates data. And every one of those data categories has a value — not only for the individual farm, but for AI studs, breeding organizations, software vendors, consulting firms and, increasingly, artificial-intelligence-based analysis systems.

The milk stays in the tank and is paid for within a few days. The data stay in databases — and their value can rise for decades.

> **KEY POINT**
>
> **data are not a by-product of modern dairy farming. They are a factor of production in their own right — and their economic value will keep growing.**

The herd becomes readable — the question is, for whom.

2. Which data arise — and who generates them?

Before anyone can talk about rights in data, it is worth understanding which data actually arise in modern cattle breeding — and who is involved in producing them.

DATA CATEGORIES IN MODERN CATTLE BREEDING

Animal data

• Pedigree, performance recording, type, fertility, health data

Genomic data

• SNP profiles, haplotypes, genomic breeding values (RZG, the German relative total merit index, and its sub-indexes)

Farm data

• Milking robot logs, feeding data, sensors, hoof trimming, group management

Advisory data

• Mating lists, selection decisions, management recommendations

Population data

• Aggregated data from reference populations, estimated parameters for breeding value models

These categories differ fundamentally — not only technically, but legally and economically. Genomic raw data arise directly from the animal. Genomic breeding values only come into existence when those raw data are linked to a reference population and to a statistical model that the breeding organization developed and operates. The whole debate about data access and data sovereignty hangs on that distinction.

So who actually generates these data: the farmer, the cow, the cooperative, the laboratory or the algorithm?

The honest answer is: all of them together. And that is precisely where the problem lies.

> **KEY POINT**
>
> **data do not arise at a single point — they arise along an entire value chain. Look only at the beginning or only at the end of that chain and you have missed the point.**

3. The data value chain

To see why the data debate is so complex, it helps to look at the whole chain from animal to breeding value — and at the question of who creates value where, and who shares in it.

Animal & farmer	Sample & lab	Database	Algorithm	Breeding value	Advice	Semen sales
Raw data	SNP profile	Storage	Model	RZG value	Mating	Revenue
Farmer	Laboratory	Organization	Organization	Organization	Advisor / org.	AI stud

Value is created at every stage of that chain — and a different party is involved at each stage. The farmer supplies the animal and the sample. The laboratory supplies the SNP profile. The organization supplies the database, the algorithm and the calculated breeding value. The advisor uses that value for mating recommendations. The AI stud sells semen on that basis.

The interesting question — and it is also the uncomfortable one — is this: who shares in that value? And in proportion to which contribution?

For the farmer it looks like this. He pays for the genomic test. He keeps the animal. He carries the economic risk. Through membership fees and testing fees he funds a substantial part of the data collection. At the end he gets a PDF or a view in a data portal. Anyone who wants to use the data in a machine-readable format for his own analyses often runs into a wall.

KEY POINT

whoever supplies the raw material should at least have a say in what happens to it. That is not a radical demand — that is fairness.

4. Who owns data at all? The legal reality

Most farmers would answer instinctively: my animal's data belong to me. The intuition is understandable — and in legal terms largely wrong.

Unlike a barn, a tractor or a cow, data are not a thing under German or European law. There is no classical ownership of data. Lawyers therefore speak today, more precisely, of rights of use, rights of access, data portability and data sovereignty — four terms, each aimed at a different aspect of control over data.

FOUR KEY LEGAL TERMS

Rights of use

• Who may use the data, and for what purposes? Usually follows from contracts and terms of business.

Rights of access

• Who may access the data, and in what format? Increasingly governed by the EU Data Act.

Data portability

• The right to receive your own data in a machine-readable format and pass them on.

Familiar from the GDPR; the EU Data Act extends the principle considerably.

Data sovereignty

• The overarching principle: who decides how data are used?

Not necessarily the party who generated them — but increasingly a policy goal.

The real question is therefore not: who owns the data? It is: who gets to decide how the data are used? That is a decisive difference — and it is the starting point of the European Data Act.

KEY POINT

who owns something is a question of property. Who gets to decide about it is a question of power. In the data economy of the twenty-first century it is almost always the second one that matters.

Every sensor creates a claim.

5. What does the EU say? The Data Act and what it means for cattle breeding

The EU Data Act came into force in February 2024. It is the European Union's most comprehensive set of rules so far on who may access data generated through the use of digital products and services. The original thinking was mainly about farm machinery, tractors, milking robots and sensors — smart farming, in other words. But the philosophy behind it reaches further.

The Data Act sets out a clear principle: whoever uses a product or a service and generates data in doing so should be able to access those data. He should be able to decide whom he grants access to. And he should not be made structurally dependent on individual providers who control his data.

In concrete terms, the Data Act requires manufacturers and platform operators, among other things, to give users access to data in machine-readable formats and to make switching data to another provider easier. Protected algorithms and the findings derived from them may still fall under trade secret protection — but the raw data the user generated himself do not, not without further argument.

THE EU DATA ACT – THE KEY POINTS FOR CATTLE BREEDING

What the Data Act requires:

• Users get access to the data they generate by using a system

• Data must be provided in machine-readable, interoperable formats

• Providers must not structurally obstruct a switch of data to competitors

• Passing data to third parties is the user's decision

What the Data Act expressly does not require:

• Disclosure of proprietary algorithms and calculation models

• Disclosure of the trade secrets of the organization processing the data

• A right of access to aggregated population data from other farms

For cattle breeding that means:

• Genomic raw data (SNP profiles) → a farmer's right of access is very likely

• Calculated breeding values → right of access likely, model protection remains

• Reference population and algorithm → stay with the organization

For organized cattle breeding this means something specific: a farmer's claim to receive his animal's genomic raw data in a CSV format and use them for his own analyses rests on far firmer legal ground under the Data Act than it did before. That is not a threat to the organizations — but it is a change they have to adjust to.

KEY POINT

for the first time, the EU Data Act gives farmers' intuitive sense of fairness a legal footing. This is not an attack on the organizations — it is a recalibration of the terms of access.

6. The breeding organizations' counterarguments — and why they are valid

A fair analysis of this subject has to take the other side seriously. The breeding organizations have arguments that hold up — and they are not merely an expression of self-interest.

A genomic breeding value does not come out of a cow's hair sample alone. Behind it stand enormous reference populations built up over decades, demanding computing centers, scientific models that are continuously recalibrated, and considerable investment in data quality assurance and infrastructure. Without that collective infrastructure, genomic evaluation would not be possible — the SNP profile of a single animal would have no interpretable value without a reference population.

The organizations therefore argue, rightly: the raw data come from the farmer. The breeding values calculated from them are the result of our work and our investment. The EU Data Act expressly acknowledges that position too — algorithms and derived findings remain protectable.

The problem does not arise when organizations protect their algorithms. The problem arises when organizations use the same argument to refuse access to the farmer's own raw data — even though those data are not their intellectual property at all.

WHAT IS LEGITIMATE – AND WHERE THE LINE RUNS

Legitimate: protecting your own calculation models and algorithms

Legitimate: protecting aggregated population data from other farms

Legitimate: protecting the breeding value infrastructure against free riding

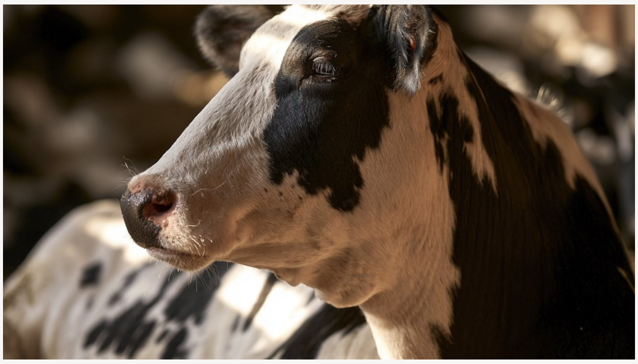
Not legitimate: refusing a fee-paying member access to raw data on his own animals

Not legitimate: structural dependency through proprietary data formats with no technical justification

Not legitimate: holding data as a means of tying members in rather than as a service

KEY POINT

organizations that protect their models are doing the right thing. Organizations that protect their members' data — from their own members — are confusing custody with ownership.



At the end stands the animal, not the file.

7. Three future scenarios — and which one is likely

What might the data landscape of cattle breeding look like in ten years? There are essentially three scenarios, and they differ considerably in their consequences for farmers, for organizations and for breeding as a whole.

Feature	Model A – closed world	Model B – controlled openness	Model C – full sovereignty
Data access	Only through the organization	CSV export on request	Farmer manages it himself
Choice of advisor	Association advisors only	External programs permitted	Free choice of any service provider
Sharing data	Organization decides	Farmer decides	Farmer decides
Openness to innovation	Low	Medium	High
Data security	High (central)	Medium	Depends on the farmer
Compatible with the EU Data Act	No	Yes	Yes

Model A — the closed world — is in effect still the reality in many organizations today. It offers stability and data quality assurance, but it creates structural dependencies that are becoming increasingly hard to defend under the EU Data Act.

Model C — full data sovereignty for the farmer — is theoretically consistent but risky in practice: hold all data in a decentralized way and you lose the reference population, without which genomic evaluation does not work. That route would make the weakness of the individual farm against the collective infrastructure visible all over again.

Model B — controlled openness — is the most likely and the most sensible scenario. The farmer gets access to his own animal and genomic data in machine-readable formats. He can use external programs, produce his own analyses and steer his own data flow. The organization goes on protecting its models and the aggregated population level. Both sides keep what belongs to them.

KEY POINT

controlled openness is not a compromise between two extremes. It is the model that comes closest both to the logic of the EU Data Act and to the founding idea of the cooperative.

8. The cooperative question: administering or enabling?

Cooperatives were founded to give farmers more independence and more market power. That was their basis for doing business. Whether they still follow that mandate consistently today is not a sentimental question — it is a strategic one.

In the context of the data economy it comes out like this: if data become the most important resource in the cattle breeding of the future — should cooperatives administer data on behalf of their members? Or should they enable their members to use those data on their own terms?

The difference is not trivial. An organization that administers data makes decisions about access, format and onward sharing. An organization that enables its members builds infrastructure, explains how things fit together, builds tools — and hands control back to where the data arose.

The first role is more comfortable. The second is truer to what a cooperative is.

And it is also the smarter business. In a world where external data platforms, artificial-intelligence-based analysis services and international genetics companies increasingly compete for access to farmers' data, organizations that strengthen their members' handling of data will generate more trust, and with it more loyalty, than those that treat data primarily as a resource of the organization.

> **KEY POINT**
>
> **enable your members and you stay relevant. Administer their data without involving them and sooner or later you will be replaced by providers who do it better.**

Conclusion: data are the currency of the future — the question is who mints it

The question of who owns the data of modern cattle breeding cannot be answered simply in legal terms — and it cannot be resolved simply in political terms either. But it can be asked honestly. And that is the first step.

The answer that does this subject justice is not: the data belong exclusively to the farmer. It is: the data arise jointly — but the farmer should be able to decide for himself who may use them and in what format they are made available to him.

That is not a radical position. It is the basis the EU Data Act is built on. It is the logic the cooperatives were originally committed to. And it is the precondition for organized cattle breeding to go on playing, in a data-driven agriculture, the central role it still holds today.

The farms of the future will produce enormous quantities of valuable data. Whoever controls those data will help shape cattle breeding. The only question is who that should be — and whether farmers really will be the ones at the wheel.

If data become the most important resource in the cattle breeding of the future — should cooperatives administer data on behalf of their members, or enable their members to use those data on their own terms?

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FARM & ECONOMICS · TECHNICAL ARTICLE

Which breed fits which farm?

Holstein, Fleckvieh, Jersey and Brown Swiss compared on the numbers

HELMUT DEMMELHUBER | MANAGEMENT CONSULTANT AND HOLSTEIN BREEDER

Breed choice used to be a question of region, of tradition, or simply of whatever semen was on offer. Today it is a strategic decision with measurable economic consequences. Holstein, German Fleckvieh (German Simmental), Jersey and Braunvieh / Brown Swiss pursue fundamentally different breeding goals. Put the wrong animals in the wrong barn and you lose money. Choose the right ones and you gain stability and return.

Four breeds — four concepts

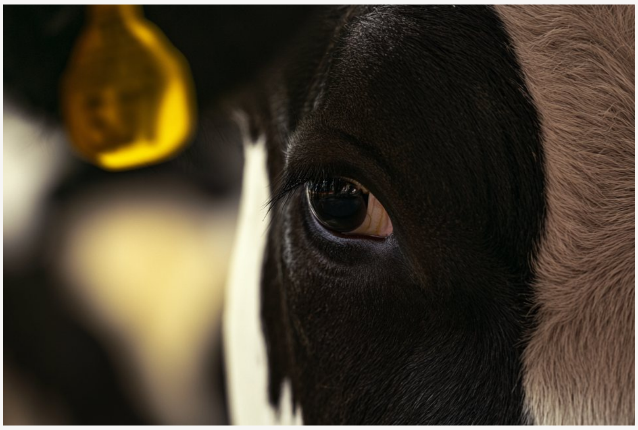
Choosing the right breed is one of the most consequential management decisions in dairy farming. It touches not only production and genetics, it reaches deep into the economics of the business: feed costs, replacement rate, calf revenue, health costs — all of it ties directly back to the breed.

Four breeds dominate dairy farming in the German-speaking countries, and they follow clearly different concepts.

Holstein — maximum milk production with functional protection

Holstein is the highest-producing dairy breed in the world. Genetic potential of 10,000 kg of milk (about 22,000 lb) and more is standard today, and top animals go well beyond that mark. Modern breeding programs long ago moved past raising volume alone: fertility, productive life, udder health and metabolic stability are an integral part of the breeding goals — expressed in Germany in the RZG, the German relative total merit index, and internationally in TPI and LPI.

The decisive factor with Holstein: the breed is less forgiving of management mistakes. Variable forage quality, patchy reproductive monitoring or insufficient cow observation show up quickly in rising veterinary and replacement costs. Keeping Holsteins successfully takes a consistently run farm and health system.



The breed does not decide alone. But it does decide with you.

German Fleckvieh — the economical all-round cow

German Fleckvieh follows a fundamentally different concept: balance between milk, beef and fitness. With production from 7,000 to over 10,000 kg of milk (about 15,400 to 22,000 lb) combined with strong growth performance, the breed offers a combination that gets underrated in comparisons based on volume alone.

One point matters in particular: Fleckvieh calves fetch considerably higher prices on the market than Holstein calves. On farms where calf revenue plays a meaningful role, that shifts the gross margin picture substantially in Fleckvieh's favor. On top of that comes a robustness that absorbs management mistakes better.

Jersey — efficiency and components in focus

At around 7,000 kg of milk (about 15,400 lb), Jersey cows deliver less volume but score with extremely high components: around 6% fat and over 4% protein. In component-based milk pricing and in cheese marketing, those are decisive advantages.

Their small body size cuts maintenance costs noticeably. Jerseys are regarded as particularly feed-efficient — an argument above all for grazing-based or forage-limited systems. The flip side: weaker calf and cull values, and a clear disadvantage where milk is paid for primarily by volume.

Braunvieh / Brown Swiss — longevity and protein

Braunvieh and Brown Swiss occupy a middle position, with a clear orientation toward protein and productive life. The breed scores particularly on lifetime production: where Holstein cows are often replaced after three or four lactations, well-managed Brown Swiss herds stay in production longer.

The economic advantage often only shows up in a multi-year calculation: lower replacement costs, stable health and a favorable casein profile for cheesemaking add up across the lactations.

Side by side: strengths, weaknesses and where each fits

The following overview summarizes the central differences between the four breeds:

Breed	Breeding goal	Main strength	Farm focus	Distinctive feature
Holstein	Milk production + function	Maximum milk	Intensive farm	Fastest genetic progress
German Fleckvieh	Balance of milk/beef/fitness	Versatility	Mixed systems	Highest calf revenue
Jersey	Efficiency + components	Fat & protein	Grazing / efficiency	Highest feed efficiency
Braunvieh/BS	Protein + longevity	Productive life	Sustainable systems	Best for cheesemaking

Table 1: comparison of the four main dairy breeds by breeding goal, strength and where they fit on the farm.

Putting numbers on it: a simplified scoring model

For a practical farm-level comparison, a simple scoring model works well: each breed is given 1 to 5 points per criterion. The comparison does not replace a proper economic analysis — it makes the logic behind a decision visible.

Criterion	Holstein	Fleckvieh	Jersey	Brown Swiss
Milk volume	5	3	2	3
Fat / protein	3	4	5	5
Feed efficiency	3	4	5	4
Calf revenue	2	5	2	3
Health stability	3	4	4	5
Productive life	3	4	4	5
Management demand	2	4	4	4

Table 2: simplified scoring model for comparing breeds (1 = low, 5 = very strong). How to read it: a majority of points in a column shows where that breed has the advantage.

The most economical breed is not the same everywhere. It is the breed that best fits the milk pricing system, the forage base, the barn and the management.

Gross margin decides — not lactation yield

A common mistake in breed comparisons is looking only at milk volume. What decides the outcome is gross margin per cow per year — and that comes out of several levers.

Milk revenue (volume × price, depending on the pricing system)

Calf revenue and the cull cow's share of revenue

Feed and forage costs

Animal health and breeding costs

Replacement costs, driven by productive life

Holstein wins the comparison on milk volume — but loses on health and fertility costs where management is patchy. Fleckvieh scores on the breadth of its revenue base. Jersey is convincing in component-based systems and falls behind where milk is paid by volume. Brown Swiss often shows its strength only in the multi-year average, through low replacement rates and stable health.

It is not lactation yield that pays the bill.

Which breed for which farm?

A farm analysis should start from four central questions:

Marketing: is milk paid for by volume or by components? Are calf prices a meaningful part of revenue?

Feeding: is an intensive feeding system with high-quality silage available — or is the farm forage-based?

Management: is consistent fertility and health management in place, or is the farm relying on robustness and a low level of intervention?

Location: intensive freestall barn, grassland site or grazing system?

Those four parameters make the breed choice almost inevitable. Analyze all four consistently and you will not make bad decisions.

Opportunities and clear limits

Where a single breed becomes risky

In practice, purebred herds are the norm — but not always the optimum. Farms that commit their whole herd to a single breed without questioning the farm system risk a structural mismatch. A Holstein herd on a poorly run farm with weak forage quality will deliver poor results year after year — not because of the breed, but because of the mismatch between the genetics and the reality of the farm.

Crossbreeding as a strategic option

For farms with concrete fertility or health problems, crossbreeding can be a legitimate short-term strategy. Holstein × Jersey or Holstein × Fleckvieh show measurable heterosis effects in fertility and lifetime production. But crossbreeding requires a clear rotation plan and a long-term breeding program — otherwise genetics blur across several generations.

Conclusion: genetics deliver production — the system decides the profit

The breeding goals of modern dairy breeds are clearly economic in their orientation, but they differ fundamentally in emphasis. Holstein optimizes for maximum milk volume, Fleckvieh for balance, Jersey for efficiency and components, Brown Swiss for stability and longevity.

What matters is not the search for the “best” breed — that question is wrongly framed. What matters is the question of the right combination of genetics and farm strategy: which breed works most efficiently in my system? Which animals deliver the highest gross margin under my specific conditions?

Do not pick the best breed — pick the one that fits the farm.

Answer that question consistently, and bring breed choice into line with the pricing system, the forage base and the management, and the business will succeed over the long run — whatever breed is on the sign at the gate.

What a lost quarter really costs

Teat injury, chronic mastitis, the three-quartered cow: what the literature gives us on recovery, compensation and the culling decision

HELMUT DEMMELHUBER | MANAGEMENT CONSULTANT AND HOLSTEIN BREEDER

A permanently lost udder quarter does not automatically end a cow's productive life. It changes her production, her somatic cell count, and the arithmetic that decides whether she stays. This article works through four questions in a fixed order: what can be prevented, what has to happen in the first hours after an injury, what three quarters actually deliver, and how to live and calculate with a three-quartered cow. It rests on published studies, on the genetic evaluation documentation of vit — the German dairy genetic evaluation center — and on the culling statistics for the vit region. The argument is methodological, not drawn from the author's own farm cases.

Prevention, first response, milking on, doing the math: what a farm actually controls when a teat is injured, mastitis turns chronic, and a quarter is lost

Two routes to the same place

A kick from the neighboring cow, a teat caught on the barn fittings, a crush in the headlock — those are the pictures that come to mind first with a three-quartered cow. They are not wrong, but they are only half the story, and probably not the bigger half.

The second route is quieter and takes longer. A quarter becomes inflamed, is treated, settles down, flares up again. At some point the question is no longer whether it can be treated once more, but whether it should be. That this is the more common route is clear from the indications under which quarters are dried off: in a German study of 25 quarters on ten farms in North Rhine-Westphalia, 17 cases had recurrent mastitis behind them and a single one a teat lesion.[1] Focus only on the kick and you are working on the rarer cause.

One caveat first. How common three-quartered cows are in German herds is not documented — there is no survey on it, neither from milk recording nor from herd health programs, only clinic populations and single-farm evaluations. Anyone who quotes a figure here is estimating.

The order of magnitude at the other end can be documented. In the 2024/25 recording year, udder disease accounted for 12.8 percent of all cullings in the vit region and milkability for 2.5 percent — third place behind infertility and feet. The share rises with herd level, from 7.8 percent in herds up to 6,999 kg to 13.7 percent above 10,000 kg.[2] Raise the production level and you raise the udder problem with it.

Prevention: the levers in the barn

The three-quartered cow usually gets discussed once she is already standing there. But a farm has more influence before than after, spread across four areas: milking equipment, teat condition, safe footing and drying off. The milking equipment has the hardest numbers behind it — and it is the area where nothing has been adjusted on many farms for years.

Take-off threshold first. A review of milking machine settings concludes that taking the unit off at 400 or 600 grams of milk flow per minute shortens milking time without any negative effect on yield or composition; a take-off threshold of 800 rather than 200 grams per minute substantially reduced tissue thickening and hyperkeratosis at the teat end.[3] Translated: most systems overmilk at the end, and that costs teat tissue without producing milk. The same paper cites a system vacuum of at least 30 to 32 kilopascals, a pulsation rest phase of at least 150 milliseconds, and an air admission within the ISO range of 4 to 12 liters per minute.

Teat condition is an early indicator, not a cosmetic issue. A systematic review of 18 papers concludes that severe teat-end hyperkeratosis is a risk factor for both clinical and subclinical mastitis. Among the figures reported are a 2.28-fold odds of clinical mastitis and a 6.01-fold odds of mastitis caused by Escherichia coli; for mild to moderate keratosis, by contrast, the association with somatic cell count was rather favorable.[4] So not every degree of keratosis is a problem — severe keratosis is. It can be scored without any equipment: twenty teats straight after take-off, once a month, always the same group.

On safe footing the evidence gets thinner. A German-language literature review on preventing teat injuries cites a firmly attached udder carried above the hock, non-slip flooring, comfortable lying surfaces, avoiding metabolic disorders, regular hoof trimming, serviced milking equipment, not overmilking, and udder supports and hobbles.[5] The paper dates from 2002 and quantifies no risk measures. I found no peer-reviewed paper that sets freestall dimensions or flooring against the risk of mechanical teat injury. The measures are plausible and standard in advisory work — but documented in the sense of a quantified risk reduction they are not.

THE LEVERS BEFORE THE DAMAGE

1 SET TAKE-OFF EARLIER

400 to 600 grams per minute cost no milk. Take off at 200 grams and you are milking teat tissue dry instead of the udder. The setting sits in the control unit and is changed in five minutes — with the milking equipment technician, not on your own.

2 HAVE THE SYSTEM TESTED AND WRITE THE NUMBERS DOWN

System vacuum, pulsation rest phase, air admission. The test report belongs in the file. Without a previous value there is no way to say next time whether anything has changed.

3 STOP OVERMILKING

Attach only once milk is flowing, no hand stripping on a quarter that is already empty. Not a technical problem but a question of the standing instruction in the parlor.

4 SCORE TEAT ENDS MONTHLY

Twenty teats straight after take-off, always the same group, the result on a sheet of paper. If the share of severe keratosis rises, that is a signal to the milking equipment — long before the cell count reacts.

5 FLOORING, FEET, METABOLISM

Secure footing in the alley and at the feed fence, regular hoof trimming, no unsteady cows. A cow that gets up confidently steps on her own teat less often.

6 TREAT DRYING OFF AS A JOB IN ITS OWN RIGHT

On 765 German farms the median new-infection risk over the dry period was 24 percent in the north, 25 percent in the east and 8 percent in the south, with very wide variation between farms.[6] The variation is the message: the difference between farms is bigger than the difference between regions.

Points 1, 2, 4 and 6 are documented. Points 3 and 5 come from a literature review with no quantified risk measures — professionally uncontroversial, but without an effect size.

What breeding can get hold of is above all udder attachment. In 29,284 French Holstein first-lactation cows, udder depth, fore udder attachment and udder balance were favorably associated with somatic cell score and clinical mastitis, with genetic correlations between −0.29 and −0.46.[7] The heritabilities in the German genetic evaluation are usable: udder depth 0.33, front teat placement 0.26, rear 0.23.[8] That a deep udder gets stepped on more often is plausible but not quantified. The breeding route is the slow one in any case — for the cow standing at the parlor tomorrow morning with blood on the unit it is of no help at all.

The take-off threshold is the cheapest preventive measure on the whole farm. It costs five minutes at the control unit.

The cell count counts too — quarter by quarter.

The teat injury: the time window decides

The most dependable German data on acute teat injury come from the Clinic for Ruminants at the University of Leipzig: 120 teat injuries in 116 German Holstein cows, May 2012 to July 2017. In 70.8 percent the teat sphincter was involved.[9] Of the teats treated, 87.4 percent were milkable after healing and 7.2 percent were amputated.[10]

That figure tends to be read as reassurance. It is not. At follow-up after at least 700 days, 21.5 percent of the surgically treated animals had been slaughtered because of problems with that teat or its quarter.[11] The teat can almost always be saved, and yet a good one in five operated cows later leaves the herd for exactly that reason. These are also patients of a university clinic: animals get referred where the trip to the clinic is worth making.

The lever sits before the clinic. In a prospective study of 106 lactating cows, the risk of fistula formation was 8.3 times higher when the teat was sutured 48 to 72 hours after the injury rather than within 24 hours. Suture material and suture technique, by contrast, had no effect.[12] The paper comes from Iran and from a grazing system; the absolute level of risk does not transfer to German freestall herds, but the direction does. What counts is the hour, not the suture material. See a bleeding teat on Friday evening and wait until Monday and you have already decided the outcome.

THE FIRST HOURS AFTER A TEAT INJURY

1 SPOT IT BEFORE MILKING

Blood on the unit, milk from a wound, the cow flinching as the unit goes on. Look only when you take the unit off and half the time window is often gone already.

2 VETERINARIAN THE SAME DAY, NOT THE NEXT

The evidence supports treatment within 24 hours; a delay to 48 to 72 hours was associated with markedly more frequent fistula formation. Here it is the farm that determines the outcome, not the clinic.

3 TAKE THE ANIMAL OUT OF THE GROUP

A bleeding teat in the group gets stepped on a second time. A quiet individual pen with a dry lying surface costs nothing and prevents the follow-on damage while you wait for the veterinarian.

4 DO NOT LEAVE THE QUARTER TO ITSELF

Milk accumulating raises pressure on the wound and increases pain. Regular, controlled emptying — by hand and into a separate container — is part of first response, not only of aftercare.

5 RECORD THE QUARTER'S CELL COUNT BEFORE SURGERY

In a Swiss evaluation, a high cell count on admission carried an unfavorable prognosis for the rest of the lactation. And without a quarter milk sample there is no comparison value for later.[13]

6 CHECK CLOSELY FOR THE FIRST TEN DAYS AFTER SURGERY

Signs of inflammation in that window also carried an unfavorable prognosis in the same evaluation. These are the days in which it is decided whether the quarter stays functional — and these are the days in which, in a normal working week, nobody looks.

This sequence does not replace a veterinary assessment. It sorts out what is in the hands of the milking staff, and it belongs on the wall of the parlor — that is where the decision is made.

In 100 hard-milking teats, peak flow rate, average flow rate and milk yield before surgery were 20, 14 and 53 percent of the values of healthy comparison teats; six months afterward they were 79, 76 and 71 percent.[14] A substantial improvement — and the evidence that the starting level is not reached again. Budget for the old production after teat surgery and you are budgeting wrong.

And amputation? It is not necessarily the end. In a Canadian evaluation of 22 cows with distal partial teat amputation, 13 of the 18 animals that could be followed up — 72 percent — were still in the herd at the start of the following lactation.[15] The sample is small, but it works as an order of magnitude and it contradicts the assumption that amputation means slaughter.

When the inflammation does not resolve

On the more common second route the decisive figure is not bacteriological cure but full cure — and the gap between the two is wide. In an evaluation of 2,883 clinical mastitis cases on twelve farms in northern Germany, the bacteriological cure rate was 73.3 percent, the full cure rate 21.4 percent and the recurrence rate 18.8 percent.[16] By pathogen, bacteriological cure ranges from 44.7 percent for Staphylococcus aureus to 87.1 percent for coliforms.[17]

The finding behind that: the pathogen is gone in three of four cases — the quarter is not, in four of five. What remains is a quarter with an elevated cell count that can flare up again. For practice this means the follow-up after a mastitis treatment must not stop at clinical improvement. Take no check sample after three weeks and you will learn about the chronic infection only at the next flare-up.

A study from Belgium and the Netherlands covering 117 clinical mastitis cases shows how often production does not come back: only 47 percent of the inflamed quarters reached the expected milk yield again within four weeks, against 68 percent for the non-inflamed quarters of the same cows.[18] That does not prove the loss is irreversible — four weeks are not a lactation. To my knowledge there is no study following three-quartered cows through a complete lactation.

Where a quarter is deliberately dried off, it works less completely than assumed. In a randomized Danish field trial with 70 cows, around day 40, 35 percent of the dried-off quarters had not atrophied and only 6 percent were completely dry; around day 10 there was an increase in swelling, hardening and signs of pain.[19] Drying off a quarter is therefore not an omission but an intervention with a course of its own. It belongs scheduled, documented, checked daily for the first two weeks — and, if at all possible, not placed in peak lactation.

The decision is made at the animal, not in the table.

What three quarters deliver — and what that costs

This is where the common account departs furthest from the evidence. The statement that the remaining quarters take over part of the milk production is correct — it just means less than it sounds like. In a study from Kiel in which individual quarters went unmilked for twelve days, daily yield per cow fell to 75 percent when three quarters were milked; the quarters still being milked raised their output by 4 percent each.[20]

Four percent per quarter. That is the documented order of magnitude — not a third, not a half. The cow ends up at roughly three quarters of her previous production, which is where simple quarter arithmetic would put her anyway. The data come from a short-term trial in 1990; for today's production levels that is a caveat worth stating.

Compensation does happen. It is time-dependent, lactation-dependent — and it is partial compensation, never a replacement.

The field gives us the figure to calculate with. In the Danish field trial the production loss of the cows with a dried-off quarter averaged 4.1 kg per day more than that of the control cows, with a 95 percent confidence interval of 3.1 to 5.0 kg. The greatest capacity to compensate was shown by multiparous cows in early lactation.[21]

Worked through: a cow loses a quarter on day 120 of lactation. That leaves 185 milking days to day 305. At 4.1 kg of additional loss per day, that comes to 759 kg of milk, or 574 to 925 kg across the confidence interval. At 45 cents of milk price per kilogram that is 342 euros, in a range of 258 to 416 euros.[22] That is less than many expect — and it is why a three-quartered cow rarely fails on milk loss alone. She fails on what stands beside it: somatic cell count, labor time in the parlor, the milking system. The figure comes from Danish organic farms and concerns deliberately dried-off quarters, not the acute injury case. Anyone with quarter-level yields from the milking system should use that quarter's actual production — and the guide figure becomes a farm figure.

HOW TO WORK IT OUT FOR YOUR COW

STEP 1 DETERMINE THE DAYS REMAINING

From today's day of lactation to the day this cow would actually be dried off on this farm — not to the end of lactation as the textbook has it.

STEP 2 SET THE DAILY LOSS

With quarter yields from the milking system: the affected quarter's actual output over the last four weeks before it failed. Without them: 4.1 kg per day as a guide, deliberately calculated across the range of 3.1 to 5.0 kg.

STEP 3 MULTIPLY BY YOUR OWN MILK PRICE

Your payout price, not the average producer price. If you receive cell count premiums, calculate with the price that will apply at the expected cell count — not with today's.

STEP 4 WEIGH THE CELL COUNT RISK AGAINST IT

Three quarters will now carry the entire milk volume, and a new infection shows up more strongly than before. This item cannot be put into euros with any honesty, but it belongs named before the calculation starts.

STEP 5 SET IT AGAINST THE REPLACEMENT

What does the heifer who is actually available cost — not the one who would theoretically be available? And what will she deliver in her first lactation against this cow with three quarters? If you have no dependable figure for the heifer, you have none for the three-quartered cow either.

The calculation decides nothing on its own. It makes sure the decision hangs on numbers and not on the look of the udder.

Which quarter is lost makes a difference. In a Lithuanian evaluation of 229 cows on milking robots in 2016, front quarters accounted for 42.2 percent and rear quarters for 57.8 percent of the milk.[23] A Polish study of 1,891 first-lactation cows puts the difference at roughly 1 kg more per rear quarter at 28.5 kg of daily production.[24] The gap varies by population, the direction is stable — and it is precisely the rear quarters that are more often affected by teat injuries. So anyone working through step 2 without quarter-level yields should calculate at the upper end of the range for a rear quarter.

Living with a three-quartered cow

If the cow stays, daily routine changes in several places — and the most important one is invisible. With the quarter gone, the basis on which the cell count is calculated changes: the composite somatic cell count is not an average across four quarters, it is a mean weighted by the quarter milk yields.[25]

Two things follow from that. If a chronically infected quarter with a high cell count drops out of the calculation, the cow's composite cell count falls — even though nothing has improved in the condition of the other three. And the milk volume across which the cells of the remaining quarters are distributed has become smaller; any increase now shows up more strongly than before.

For herd health management that means a three-quartered cow has to be assessed afresh once the quarter is gone, not against her old cell count history. Monitor her only through the composite cell count and you will see an improvement that is not one, and miss a deterioration that is. In practice: record a new baseline and set the alert threshold against that — not against the herd threshold.

The California Mastitis Test belongs in the routine, but it has limits. In a study of 520 quarters from 131 cows, the sensitivity of the CMT on the third day after calving was 56.7 percent for any pathogen and 66.7 percent for major pathogens, with specificity around 55 percent.[26] As a screen it is fast and useful; as an all-clear it is no good. So with a three-quartered cow: run the CMT at every opportunity when you are at the udder anyway — plus a bacteriological quarter milk sample when a decision about her future is being made or she is to be dried off.

There is one piece of reassurance. According to a German study on 16 farms with 1,126 cows, an infected quarter did not raise the new-infection risk of the other quarters of the same cow.[27] A three-quartered cow is therefore not a walking source of infection for her own udder. She is a cow with less reserve.

THE THREE-QUARTERED COW DAY TO DAY

MARK HER VISIBLY — ON THE ANIMAL AND IN THE PROGRAM

A colored mark every milker sees before attaching, and an entry in the herd management program. Relief staff and holiday cover do not know the cow, and one wrongly attached unit is enough.

DO NOT MILK THE QUARTER

Plug the liner or shut the quarter off, and no hand stripping. Overmilking is named explicitly in the literature as a risk factor — here on a quarter that is already compromised.

QUARTER CELL COUNTS INSTEAD OF COMPOSITE

The composite value misleads in both directions on these animals. Without quarter-level values you are monitoring the wrong measure.

SET A NEW ALERT THRESHOLD

Note the baseline after the quarter is lost and set the threshold against that value. The cow's old history has become worthless as a benchmark.

CORRECT THE PRODUCTION EXPECTATION

Around three quarters of the previous level, and rather less if it is a rear quarter. Keep measuring her against her old lactation curve and you will cull her for the wrong reason.

CLARIFY IT WITH THE MILKING SYSTEM BEFORE DECIDING

Whether and how a single quarter can be permanently deactivated on your own system is a question for the service partner — in writing, before the cow stays. On a robot there is the added question of whether attachment works reliably with three quarters.

The effort per animal is small. But it comes up every day, in places where nobody asks — which is why it belongs written down.

A three-quartered cow is not a special case. She is a calculation.

The decision: stay or go

A three-quartered cow is not a reason to cull, she is a cow with a changed basis of calculation. The question is not whether she has lost a quarter, but whether she is better with three quarters than the heifer who would take her place. The benchmark is the expected remainder of her own productive life — in the vit region, culled cows in 2024/25 averaged 38.2 months of productive life and 31,691 kg of lifetime production.[28] A second-lactation cow with three healthy quarters stands quite differently in that comparison than a fifth-lactation cow with an elevated cell count.

- Which quarter is gone — front or rear, and how much milk did it actually give most recently?
- What are the cell counts of the three remaining quarters, measured individually and not derived from the composite?
- What stage of lactation is she at, and which lactation?
- How sound is she outside the udder — fertility, feet, metabolism?
- How high is her breeding value, and are there daughters from her in the herd or on the way?
- Is there a rearing place and a heifer actually available?
- Will the milking system cope with her — and at what effort?

On that last point, an honest answer: whether and how a single quarter can be permanently deactivated on the common milking robot systems could not be established in this research from a dependable, dated source; the manufacturers' herd management documentation is not public. Anyone facing the decision should ask their own service partner and get the answer in writing. What is documented is that attachment depends on teat placement, and that udder type traits can be estimated from the robot's teat coordinates with heritabilities between 0.37 and 0.67 — considerably higher than from classification.[29]

Conclusion: documented, calculated, open

Four statements are documented. First: the more common route to a dried-off quarter is not injury but inflammation that resolves bacteriologically and not cytologically. Second: with an injury the hour decides, not the suture material — and saving the teat is not the same as keeping the cow. Third: compensation is in the order of 4 percent per quarter. Fourth: an earlier take-off at 400 to 600 grams per minute costs no milk and measurably spares teat tissue.

Calculated, not measured, is everything that follows from this for the individual farm — the milk price calculation, the comparison against a replacement, the effect on herd cell count. Those calculations are only as good as the quarter-level data that go into them. Without them you are deciding by feel.

Three things remain open. How common three-quartered cows are in German herds has not been surveyed. How their production develops across a complete lactation has not been studied — every available paper ends after weeks. And what share barn design and flooring have in the risk of mechanical teat injury has not been quantified. All three gaps concern questions that are decided in the barn every day.

It is not the missing quarter that decides whether the cow stays, it is the condition of the other three.

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ANIMAL HEALTH · TECHNICAL ARTICLE

What the hoof goes through every day

Walking surfaces, the robot area and standing time — where hoof health is decided, and why feeding is an amplifier and not the sole cause

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When hoof lesions start piling up, the first conversation is about the ration — it is the quickest thing to change. The evidence points elsewhere. What loads the hoof is the floor it stands on and the number of hours it stands there. Both come out of barn geometry, stocking density and how milking is organized, and on a robot farm out of walking distance and waiting time as well. This article sorts the evidence, names the target values that are actually backed up, and identifies the places where the research gives us nothing.

Nobody sees two of every three lame cows

Start with the figure that frames every discussion about walking surfaces. A 2025 meta-analysis pulled together twenty-five years of northwest European literature: 53 studies, a pooled lameness prevalence of 28 percent with a confidence interval of 23 to 33 percent.[1] That value applies to the broader lameness definition — for the narrow one the authors report no estimate at all, because the spread was too wide. Anyone quoting the figure should supply the definition with it.

The real finding is somewhere else. In the German PraeRi data set, around 85,000 cows on 765 farms were locomotion scored and the farm managers were asked in parallel for their own estimate. Median prevalence as recorded by veterinarians was 23.1 percent in the north, 39.1 percent in the east and 23.2 percent in the south. The farmers estimated 9.5, 9.5 and 7.1 percent. From that it follows that 45.3 percent of the lame animals in the north, 24.0 percent in the east and 30.0 percent in the south were perceived as lame at all.[2]

Two of every three lame cows are not perceived as lame in the barn. If you want to know where your hoof health stands, you have to score.

What bears on the claw

Biomechanics is the part of hoof health that can be measured. A Leipzig research group measured pressure distribution on isolated, functionally trimmed hind limbs: on concrete an average of 44.7 newtons per square centimeter with a maximum of 130.3, spread across roughly 33 square centimeters of loaded area — on the rubber floors tested, 24.9 to 29.7 on average, maximum 71.9 to 87.2, across 48 to 58 square centimeters.[3] What matters is not only the level but the location: peak pressures occurred on the outer claw, plantar and abaxial — exactly where the typical sole ulcer develops.

The second mechanism gets overlooked more often. A cow does not slip on the straight, she slips on the turn, when starting off and when braking. A Dutch research group measured ground reaction forces and derived the required coefficient of friction from them: walking straight and turning, it reached about what the floor can just supply; stopping and starting suddenly, it went beyond. A Canadian series of trials on purpose-built walkways confirms that for starting, a right-angled turn and a gutter — and it delivers a finding that too rarely reaches advisory work: a thin film of slurry increased slipping frequency, step count and time taken, and that could not be offset either by more roughness or by more compressibility.[4] A grooved floor cannot rescue a dirty surface.

No floor can do everything

That concrete is harder on the claw than a soft surface is well documented, and most clearly so in first-calf heifers. In a Swedish trial, heifers standing on slatted concrete rather than rubber-covered slats after calving had a 3.6-fold higher risk of lameness and a 2.2-fold higher risk of sole hemorrhage and ulcers. During the rearing phase of the same animals, horn wear on the concrete alley was 6.08 millimeters a month against 2.09 on a deep-bedded pack.[5]

Conclude from that that rubber solves the problem and you have read half the literature. A German doctoral thesis quantified growth and wear over twelve months in 69 cows: net horn growth of 3.4 millimeters a month on rubber against 1.2 on concrete, because wear dropped from 3.5 to 0.3 millimeters. Changing the surface produced no reduction in the prevalence or severity of claw disorders. The opposite mistake is a fringe topic here and a headline finding in American data: on one large farm in the southeastern United States, toe ulcers resulting from thin soles accounted for 20 percent of the lesions recorded and thin soles as a finding in their own right for another 13 percent — more than white line disease.[6]

With the infectious disorders the ranking reverses. A Norwegian case-control study found a 2.36-fold higher probability of digital dermatitis for solid alleys than for slatted floors. A second Norwegian paper sums up the trade-off: solid floors are more favorable for most laminitis-associated lesions, slatted floors for the infectious disorders — but not for locomotion.[7]

Relieve the sole and you lose wear; get the manure away and you lose walking comfort. The question is which problem the herd has right now.

Standing time is the currency

A cow's time budget is a zero-sum game: what milking takes is missing from lying. A video analysis of 205 cows in sixteen freestall barns shows the range in practice. Time out of the pen for milking ran from half an hour to six hours a day, averaging 2.7 hours, and it had a negative effect on eating and lying time.[8] That forced standing acts directly on behavior is experimentally documented; the path from standing to a finished sole ulcer, by contrast, is epidemiologically supported but has still not been cleanly reproduced in a trial.

The most important finding for the German-speaking region does not concern the alley at all. In a cross-sectional study on 103 farms in Germany and Austria with Holstein and Fleckvieh, mean lameness prevalence was 34 percent, with a range from zero to 81 percent. Three stall-related risk factors made it into the final risk model — mats instead of a deep-bedded pack, obstructed head lunge space, too short a neck rail diagonal — along with lying behavior and body condition. Walking surface variables do not appear there.[9] That is a counterweight to an argument too centered on flooring: in that data set the stall mattered more than the alley.

In the robot area both come together

A robot farm has no milking time and no holding pen — and the cows still stand for a considerable time at the tightest point in the barn. A video analysis of one pen with 59 cows found the animals visited the robot an average of six times a day and waited fifteen minutes per visit, 88 minutes per cow per day in total, with a range of 5 to 322 minutes. First-lactation cows waited longer, and cows with long waiting times lay down less — 9.5 hours against 11.1.[10] The study covers one farm and two observation days; it works as an illustration, not as a benchmark.

The feedback loop is the real point. A cross-sectional study on 41 robot farms found that lame cows gave 1.6 kilograms less milk in 0.3 fewer milkings and were 2.2 times more likely to need fetching more than once within six days.[11] The lame cow goes less often on her own, so she is fetched, stands for longer in the process — and does not get healthier for it.

The robot makes milking time invisible, not standing time. It only spreads it across the whole day.

Where feeding comes into it — and where it does not

The clearest available test of the relative weight comes from a Swedish trial that tested flooring type and concentrate level against each other factorially in heifers: the animals on concrete with a high concentrate allowance had the highest sole hemorrhage scores, and flooring type had a greater influence than concentrate level. The authors named the abrupt switch from pasture to barn and the periparturient phase as the most significant factors.[12] The animals were tied — only partly transferable to today's freestall conditions.

A second pathway runs through the manure. In a British study, heifers on a wet fermented ration developed more claw horn lesions and softer horn than those on a dry ration. The authors' explanation was not the rumen but the long periods standing in liquid slurry. The ration changes the consistency of the manure, the manure changes the walking surface, the walking surface changes the horn. That fits the sober state of the meta-analyses: of all feeding-related variables, only body condition has so far made it into a dependable pooled estimate.[13] No ration parameter is among them.

Dimensions and target values — and how much of it is backed up

On alley dimensions the evidence looks different from flooring and stalls: many recommendations, few studies. The following values come from the codes of practice in the German-speaking countries and from the international advisory literature — useful, but almost none of them derived from a threshold analysis with lameness as the endpoint.[14]

PLANNING DIMENSIONS AT A GLANCE

WALKING SURFACES AND MANURE REMOVAL

- Alley in a new building, dehorned animals: at least 2.50 m, 3.00 m recommended
- Feed alley in a new building: at least 3.50 m, 4.00 m recommended
- Crossovers after 15 to 20 head-to-head freestalls, avoid dead ends
- Slat gap 3.5 cm maximum, slat width 8 to 13 cm
- Scrape solid floors at least twice a day

ROBOT AREA

- Holding area 15 to 20 m² per milking box, no side under 3 m
- Transitions in an AMS barn 2.5 to 3.5 m, that is two to three freestall widths
- Feed alley under 430 cm: an independent risk factor, odds ratio 1.9
- Clear space in front of the robot 6.1 m for one, 7.0 to 7.6 m for two side by side
- Cows per robot 55 to 60 — other advisory sources give 60 to 80
- Fetching on average 10 percent of lactating cows a day or fewer

FREESTALL

- Stall width 0.83 × withers height, lying length 1.1 × diagonal body length
- Bedding at least 30 cm of deep bedding on concrete, at least 5 cm compressed on mats
- Barn area at least 9 m² per cow including lying area

Of these values, only the feed alley width is derived from an analysis with lameness as the endpoint. The figures for robot stocking differ considerably between advisory sources — anyone planning is choosing between two schools of thought, not between right and wrong.

Three gaps belong named. For turning radii, bottlenecks and transitions as quantified risk factors there is no study with an effect estimate — the argument rests indirectly on the friction measurements. On the alley scraper as a disturbance to cow traffic there is no dependable primary study. And a direct link between scraper frequency and hoof health is not documented, only the two halves of the chain are.

What a cow walks every day appears in no ration.

Early detection is the biggest lever

Two randomized trials by the same British group test the same treatments and reach opposite results; the difference lies solely in timing. In 167 newly lame cows, 24.4 percent recovered after 35 days with therapeutic trimming alone and 56.1 percent with a block and pain relief together. In cows that had already been lame for more than two weeks, the figures after 42 days were 15.4, 14.8 and 16.0 percent — no treatment effect left.[15]

That makes locomotion scoring the actual intervention. The international guideline recommends a five-point scale, ideally scored every two weeks, with around 90 percent of cows at score 1 as the target. What hangs on it shows up on the cost side: a bioeconomic model puts the figure at 391.80 euros per cow affected by digital dermatitis per year.[16] The larger part of that never appears as an invoice but as milk not harvested, a longer calving interval and early culling — which is why hoof health so rarely shows up in the farm accounts.

A case from advisory work

The following case comes from a recent herd analysis and shows a herd in which the floor is the cause and the ration plays the supporting role. Farm and animals are anonymized, the figures are unchanged.

ROBOT HERD, ABOUT 120 MILKING COWS, 33 KILOGRAMS DAILY YIELD

THE PATTERN OF FINDINGS

Across four years of the farm's own hoof trimming records, 64 percent of the documented cows had a lesion at least once and 34 percent had a glued block at least once. The most frequent individual findings: horn quality, cracks and laminitis in 27 percent, white line lesion in 22 percent, sole ulcer in 15 percent.

THE WARNING SIGNAL

At one trimming session in August, all four feet of every animal were assessed for the first time: 22 of 22 cows with a lesion, among them 20 white line lesions, 18 of those on a hind claw. Lactations 1 to 7 were affected and days in milk ranged from 40 to 420 — no fresh cow cluster, no age pattern.

THE ROBOT FIGURES

2.6 to 2.8 milkings plus 2.5 to 3.3 refusals per cow per day across a full year — five to six trips to the robot daily, almost half of them without a milking, each one involving walking there, waiting, turning and walking back on the most heavily used stretch of concrete in the barn.

THE FEEDING SIDE

Across 366 daily records the fat-to-protein ratio ran between 1.07 and 1.13 by month, and fat content between 3.81 and 4.09 percent. No month pointed to chronic rumen acidosis at herd level — that clears the ration in its basic design, but it says nothing about individual groups.

THE DOCUMENTATION TRAP

Fully documented trimming sessions found a lesion in 60 percent of cows, incomplete ones in 14 percent. The difference was in the check box, not in the claw.

THE ORDER IN WHICH TO WORK THROUGH IT

First the walking surfaces and the robot area — grip, condition of the concrete, edges, bottlenecks, turning areas. Second standing times and waiting time at the robot. Third the trimming interval and sole thickness. Fourth the concentrate curve at the robot, not because of the starch load but because of the visit frequency. And only after that the ration itself.

Two things can be generalized. A pattern of findings with no lactation-stage signature argues against a transition cause and for a loading cause. And the first complete documentation of all four feet produces an apparent deterioration that is in reality a jump in recording.

Twenty white line lesions in a single day right across all lactations is a statement about the barn, not about the feed bunk.

Ten tools for the working day

The first five tools cost nothing but time and attention. The last five cost money or a rebuild.

TOOL 1 — THE COW WALK

GOAL: SEE WHERE THE CLAW IS WORKING

Walk through the barn once with a cow's eyes. Where does she take short, careful steps? Where does she slip? Where does she turn on the spot? Where does she get crowded? The critical points are known: robot exit, holding area, transitions, the water trough area, tight turns. The friction measurements say the same thing — on the straight the grip is enough, on the turn and when starting off it is not.

TOOL 2 — SCORE, DO NOT GUESS

GOAL: SEE THE PROBLEM AT ALL

A five-point locomotion score, every two to four weeks, in the same place, by the same person. Target around 90 percent at score 1. Keep that up for three months and you will know more about your barn than any report can tell you — and you will pick out the animals where treatment still works.

TOOL 3 — DOCUMENT ALL FOUR FEET

GOAL: MAKE SESSIONS COMPARABLE

Assess all four feet on every cow, even when three of them say no finding. Only then can sessions be compared, and only then can you check whether a measure has worked. If operating the app in the trimming chute fails because of the gloves, decoupling helps: one spoken sentence per cow into a recorder, transferred afterward at the desk.

TOOL 4 — THE STANDING TIME CLOCK

GOAL: PUT A NUMBER ON THE TIME BUDGET

Write it down on a normal day: when are cows locked up, and for how long? How long does breeding, hoof trimming or the vet round take? How long does the group stand outside while stalls are bedded? Add it all up. More than three hours outside the normal routine means lying or eating time is missing.

On a robot farm, waiting time at the robot belongs in that total. With no sensor data, spend an hour at the robot one afternoon and count how many animals are waiting and for how long.

TOOL 5 — FOUR ROBOT FIGURES

GOAL: MAKE THE WALKING LOAD VISIBLE

Milkings per cow per day, refusals per cow per day, cows per robot, share of cows fetched. Once refusals approach the number of milkings, every cow is walking there five to six times a day. For fetching, the guide figure is an average of ten percent of lactating cows or fewer.

And think the feedback loop through: the cow who has to be fetched most often is, more often than not, the lame one.

TOOL 6 — MAKE SOLE THICKNESS A RULE

GOAL: STOP THE INVISIBLE MISTAKE

Agree with the hoof trimmer that dorsal wall length is measured and not estimated, and that a minimum sole thickness is maintained. Claws trimmed too thin are a lesion that only shows up as lameness weeks later — and then gets blamed on the floor.

TOOL 7 — THE SCRAPER PLAN

GOAL: GET RID OF THE GREASY FILM

Scraping at least twice a day is the minimum standard in the animal welfare guideline; in practice, scraping considerably more often is what works. The point is not cleanliness as such but grip: a thin film of slurry costs secure footing, and neither grooves nor rubber can make that up.

TOOL 8 — RUBBER WHERE IT COUNTS, NOT EVERYWHERE

GOAL: RELIEVE THE LOAD WHERE IT MATTERS

Priority goes to the areas with turning, waiting and crowding: the robot or parlor exit, the holding area, transitions, the feed alley. Covering everything in rubber cuts wear so sharply that the trimming interval has to be adjusted — otherwise you trade one problem for another.

With infectious disorders, check the direction: solid floors are the less favorable surface for digital dermatitis. Put rubber down there and manure removal has to be thought through with it.

TOOL 9 — THE STALL BEFORE THE ALLEY

GOAL: TACKLE THE DOCUMENTED MAIN CAUSE FIRST

In the German-language risk data, lying comfort mattered more than the walking surface. Check first: neck rail position, head lunge space, brisket board height, amount of bedding, stall width relative to the largest quarter of the herd — and the stocking rate. Above one hundred percent stall occupancy costs lying time.

In heifers, neck rail position decides whether they learn to use the stall at all. If you are bringing first-calf heifers in, that area should be laid out most generously of all.

TOOL 10 — PLAN THE TRANSITION PHASE

GOAL: NO WAVE EIGHT WEEKS AFTER THE REBUILD

Freshly poured or grooved surfaces, a switch from pasture to barn, a new group structure: these are loading phases. Score more frequently during those weeks, do not add driving pressure, and bring hoof trimming forward rather than pushing it back.

The reason is physiological: horn production adapts to a changed wear rate only with a delay. The weeks in between are the ones in which the sole gets too thin.

Conclusion: the claw carries the consequences, with a delay

The evidence adds up to a picture that is less comfortable in practice than the feeding hypothesis, because it points at things that cannot be changed in a week. Concrete produces almost twice the sole pressure across a markedly smaller area, and it does so exactly where the sole ulcer develops. The friction reserve is enough for walking straight, not for turns and stop-and-go. A thin film of slurry costs grip that no groove pattern brings back. And on a robot farm milking time disappears from the daily routine and reappears as waiting time. Feeding is no sideshow in this, but its role is different from what is assumed: where flooring and concentrate were tested directly against each other, flooring weighed more.

For herd analysis that implies an order. First sort the pattern of findings: if white line lesions and sole ulcers dominate, the issue is loading and horn quality; if digital dermatitis and footrot dominate, it is moisture and hygiene — two jobs whose solutions partly pull against each other. Then determine the window in which the lesions formed, eight to twelve weeks back. Then the stall, the walking surfaces and standing times. And only after that the ration.

The claw carries the consequences of barn management. It just carries them with a delay — and that is why the connection is so often missed.

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ANIMAL HEALTH · PRACTICE

Shamonda and the spring that follows

What is documented about the new orthobunyavirus in cattle, what appears transferable from the Schmallenberg episode, and what a farm can do before the 2027 calving season

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Since June 2026 an infection event has been running through cattle in central Europe that has outpaced state laboratories, breed associations and advisory services all at once. This article sets out what is documented about the Shamonda virus, what the 2011 Schmallenberg episode is good for as an order of magnitude, and where the evidence remains open. It follows the order in which the questions come up on the farm: the acute picture, the reporting and legal situation, the pregnancies, the room for action that remains. It rests on publications from the Friedrich-Loeffler-Institut — Germany's federal research institute for animal health — from the state authorities and from the Swiss and French institutes as of September 14, 2026, and on the cited literature on the Schmallenberg virus. Every figure taken over carries its period and its study population with it.

One pathogen, two introductions

The Shamonda virus is an orthobunyavirus of the Simbu serogroup and is transmitted by biting midges, that is by blood-feeding Culicoides. The Schmallenberg virus and the Akabane virus belong to the same serogroup. In the assessment of the Friedrich-Loeffler-Institut there is no relevant infection risk for humans.[1] The pathogen itself is not new: it was first detected in Nigeria in the mid-1960s and after that appeared sporadically until 2026 in western, eastern and southern Africa and in Asia.[2] In Japan, six isolates were obtained in 2002 from Culicoides midges and from blood samples of sentinel cattle in Kagoshima and Miyazaki prefectures; even then the finding was taken as an indication of wider distribution than assumed.[3]

What is new is its appearance in central Europe. In June 2026, dairy herds in eastern France showed acute fever, diarrhea, apathy and a marked drop in milk production. Untargeted nanopore metagenomics from pooled plasma of sick cows yielded complete genomes of an orthobunyavirus of the Simbu serogroup; the L and M segments clustered with the Nigerian Shamonda virus, while the S segment showed a divergent pattern.[4] In early August 2026 the Friedrich-Loeffler-Institut identified the same pathogen type in cattle in southern Germany. The samples came through the state chemical and veterinary laboratory in Freiburg; the pan-Simbu PCR gave clearly positive signals with Ct values around 20, meaning high viral loads.[5] The southern German isolate is designated Shamonda virus/DE/2026.[6]

One point matters for context: this is not one event but two. On September 1, 2026, the Friedrich-Loeffler-Institut confirmed a second variant, also related to the Shamonda virus. The positive cattle samples came from North Rhine-Westphalia, Lower Saxony, Hesse and Thuringia. To tell them apart, the variants have since been called Shamonda virus Europe 1 (SHAV-EU1) for the one first detected in Switzerland, France and southern Germany, and Shamonda virus Europe 2 (SHAV-EU2) for the second. Initial investigations show that all three genome segments of the two variants differ. Whether infection with one variant protects against the other is not established. Three orthobunyaviruses of the Simbu serogroup are therefore currently circulating in Germany — the Schmallenberg virus and the two Shamonda variants — and an exchange of genome segments between them is considered not unlikely.[7]

Genetically, SHAV-EU1 sits close to the Shamonda virus reference isolate: 93 percent nucleotide identity in the L and M segments, 97 percent in the S segment. The same investigation is the source of the only dependable figure on scale: by the end of July 2026, well over 100 affected farms in Baden-Württemberg had been reported to the cattle health service — a report to a health service, not an official case count.[8] It spread quickly. In Switzerland the first detection was on July 31, 2026; by August 20 it had reached 22 cantons and Liechtenstein.[9] In Bavaria there are now detections from every administrative district.[10]

The open question is not in the barn. It is in the pregnancies.

The acute picture is impossible to miss

The clinical picture in the adult animal is described consistently: a marked drop in milk production, fever, dull and apathetic animals, sharply reduced feed intake, diarrhea in some cases, and in a proportion of herds mild respiratory signs as well. After a few days the affected animals usually recover markedly.[11] The Bavarian animal health service gives an order of magnitude for the milk drop of more than five kilograms per animal.[12] From Switzerland, fever above 40 degrees Celsius over one to two days and a disease course of 14 to 21 days are reported.[13] At herd level, morbidity in the Friedrich-Loeffler-Institut survey reached up to 100 percent, with no deaths so far.[14]

From an affected herd: the manager of a Bavarian dairy farm reports that the event took in the whole herd within two weeks. The drop in milk production was for the most part sudden and, to her, unmistakably different from heat stress. She had heard of different degrees of severity in other herds; in her own the picture was impossible to miss. This account is not a recorded case number, it is a farm manager's description. In its course and its speed it matches the published observations.

“There was no mistaking that for heat stress.” — manager of an affected Bavarian dairy farm, September 2026

From a second herd: there the event was more severe and above all longer. Numerous immunocompromised animals and cullings from secondary disease are reported. Herd production fell from a good 40 liters to 33 liters per cow per day; after six weeks it was back to 36 liters, still around four liters below the starting level. The animals' visiting behavior fell off markedly, which brought considerable extra work over the whole period. This too is a farm account and not a recorded figure.

Calculated: in a herd of 100 cows the drop described amounts to around 700 liters a day at its lowest point and still around 400 liters a day six weeks later. The cumulative loss over the six weeks cannot be calculated from this, because the course between the low point and the current level is not known.[15]

What the two accounts add: the published figures describe a mild to moderate, temporary course with a clear recovery after a few days and an illness lasting two to three weeks. That captures the average course. It does not describe the tail: milk production that is still not back after six weeks, cullings from secondary disease, and a workload that ties up a herd for weeks. On that tail there are so far no surveys, neither of frequency nor of magnitude. Anyone concluding from the overview documents that the economic damage amounts to a few days of reduced milk is underestimating it substantially on some farms. That is no contradiction of the publications. It is the difference between a description of the course and an estimate of the damage, which nobody has yet produced.

Susceptible species, on current knowledge, are cattle, sheep, goats, alpacas and horses; in horses, central nervous signs have been observed in Europe after infection with SHAV-EU1.[16] For SHAV-EU2 all positive samples so far have come from cattle, and the host range has not yet been determined.[17] Viremia is short. For detecting the pathogen by PCR, serum or EDTA blood samples are suitable, and they have to be taken during that short phase. The decisive point is therefore to sample acutely, clinically sick animals — animals with fever, diarrhea and a milk drop, not animals already recovering.[18]

The information arrived after the event

The novel Shamonda virus is not a listed animal disease. It is neither notifiable nor subject to statutory control. It follows directly that there is currently no possibility of compensation from the Tierseuchenkasse, the state animal disease compensation fund; for Bavaria that is stated expressly.[19] But the same legal position also has a consequence that usually gets lost in the discussion: with no duty to report there is no mandatory flow of data. There is no official case count, because there cannot be one. What exists are submissions to the state laboratories and reports to health services. In Bavaria a passive monitoring scheme was set up at the state office for this purpose.[20]

Passive monitoring means the system sees what gets sent in. With a vector-borne pathogen that runs through a naive population in weeks, the lag between event and information is therefore built into the system. This is no failing of individual agencies. It is the consequence of vector transmission, no duty to report, and a pathogen nobody had on their radar. In practice it means a farm receives the association's information about cases in a neighboring country at a point when the event is already under way in its own herd. That is exactly how it went in many places in the summer of 2026.

What applies regardless: even with no duty to report and no statutory control, livestock keepers have general obligations under European animal health law. These include biosecurity measures appropriate to the risk, among them the isolation of sick animals. Animals showing the relevant clinical signs must not be moved.[21] Anyone selling animals or taking them to a sale during the acute phase is therefore not operating in a legal vacuum but against an express requirement.

The open question is the pregnancies

For the acute event in the adult animal the situation has been described. For the pregnancies it has not. The Friedrich-Loeffler-Institut puts it cautiously: for the newly introduced virus it is not yet possible to assess whether and to what extent infection of pregnant animals can damage the fetus; abortions, stillbirths and malformed calves or lambs from potentially affected herds should therefore be examined with particular care.[22] The Bavarian state office goes a step further: whether infection during pregnancy leads to arthrogryposis-hydranencephaly syndrome is currently still unclear, but given the close relationship to the Schmallenberg virus it is considered very likely.[23]

For the vulnerable phase of pregnancy the Friedrich-Loeffler-Institut gives approximately the fourth to eighth week of gestation in sheep and approximately day 75 to day 175 of gestation in cattle. These figures are expressly framed by analogy to the Schmallenberg virus and have not yet been determined experimentally for the Shamonda virus.[24] That is not hair-splitting, it is the decisive caveat: what is being used here is a transferred time window, not one measured for this pathogen.

Scale that down to a herd affected in July or August 2026 and it held cows within the assumed vulnerable window that had been bred in spring and early summer 2026. Their calvings fall in the spring of 2027. The worry about those births, currently being voiced on affected farms, is therefore technically well founded and cannot be talked away. But it cannot be quantified with the data available either.

What the Schmallenberg episode gives us — and what it does not

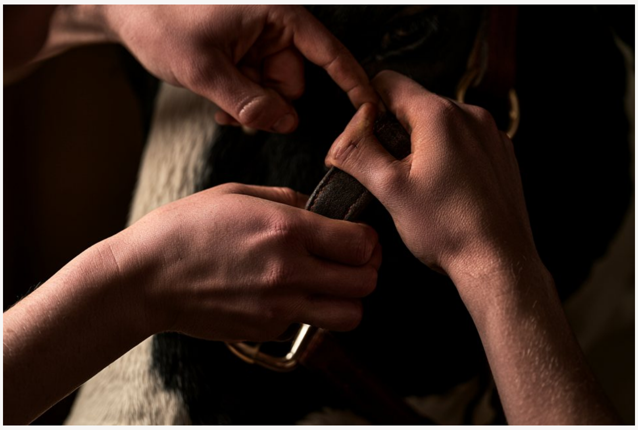
The Schmallenberg episode of 2011 and 2012 is the only central European precedent with dependable follow-up. It is a different virus and must not be read as a forecast; but it does supply orders of magnitude against which expectations can be set. On the speed of spread: in one closely sampled cattle herd in the core region, within-herd prevalence reached 100 percent within barely a month during the 2011 vector season. [25] That matches what farms are describing in 2026 for the Shamonda virus.

On the consequences for the offspring: in a follow-up study on two dairy farms in North Rhine-Westphalia, 71 calves were examined whose dams had been naturally infected with the Schmallenberg virus in the first five months of gestation, calculated as between day 13 and day 162. One calf showed typical malformations and was stillborn, another was born dead with no visible changes. Two cows aborted, with no viral genome or antibodies detectable in the fetuses. Nine of the 71 calves carried high specific antibody titers even before colostrum intake, meaning they had been infected in utero, and all nine were born alive and clinically normal. In December 2011, 80.1 percent of the cattle sera examined on those same farms were positive; for spring 2012, a seroprevalence in cattle of around 70 to almost 100 percent is reported for the core region on the German-Dutch-Belgian border.[26]

At population level the damage rate turned out low. For Dutch dairy herds, around 0.5 percent stillbirths or malformations from fetal Schmallenberg infection is given.[27] The production side was also unremarkable, unlike 2026: between August 15 and September 19, 2011, milk loss on Dutch dairy farms was 0.26 kilograms per cow per day against the 2009 to 2010 reference period; in the subgroup of farms that had reported malformations in newborns during the reporting requirement then in force, it was 0.43 kilograms.[28]

Caution is needed here. The acute picture with the Shamonda virus is incomparably more severe than what was documented in 2011 and 2012 for the Schmallenberg virus — a good five kilograms of milk loss per animal against a good quarter of a kilogram as a herd average. But nothing follows from that for the fetal damage rate, in either direction. How hard a virus hits the adult animal clinically and how teratogenic it is are two different properties. The 0.5 percent also comes from a different population, a different period and a different pathogen. It is useful as an indication of the order of magnitude to expect. It is not useful as a number for your own herd in the spring of 2027.

The Schmallenberg episode supplies an order of magnitude. It does not supply a forecast for the spring of 2027.



Documenting is the only measure that already works today.

A pause in breeding — what it can do and what it cannot

The measure most often named at present is moving the breeding date. The Friedrich-Loeffler-Institut puts it cautiously: in principle an attempt can be made to place the particularly sensitive phases of gestation outside the vector-active season. Peak midge activity is usually observed between July and October; depending on the weather the season can run into late November. On the same assessment, conventional vector control can hardly prevent transmission entirely.[29]

The objection from practice to this measure is valid and should not be brushed aside. A breeding pause works prospectively. It assumes a farm knows months in advance that something is coming. In the summer of 2026 that was not the case: by the time the recommendation was circulating, the event had already reached the affected regions. For 2026 the measure was moot across much of southern Germany.

For 2027 the question looks different. Anyone setting breeding and calving plans now is planning with lead time and not in hindsight. And anyone farming in a region not yet affected genuinely has the option. The second common line of thinking — that an infection already gone through protects the herd, so a pause is superfluous anyway — is precisely that: an assumption. For the Shamonda virus, the duration and robustness of immunity after natural infection have not been described. Whether infection with one of the two European variants protects against the other was, as of September 9, 2026, not established.[30] Since both variants are circulating in Germany and differ in all three genome segments, the question is not academic.[31] No vaccine is available; vaccines against orthobunyaviruses can in principle be developed, but that needs sufficient lead time.[32]

- Has my herd demonstrably been affected — with a PCR result from the acute phase, or only on clinical impression?

- Which variant was detected, and does my region lie in the overlap area of the two variants?
- Which cows were between day 75 and day 175 of gestation between July and October 2026, and when do they calve?
- Are the breeding records for that group documented well enough for their calvings in spring 2027 to be monitored specifically?
- Would moving the breeding season for 2027 be viable for the business — and what would it cost in calving interval and replacement rate?

What to do on the farm now

The room for action is limited, but it is not zero. It lies less in defense than in diagnostics and documentation. Record cleanly now what happened in the herd and in the spring of 2027 you will be able to tell whether a malformed calf belongs to the event or not, instead of guessing.

1. Use the acute phase. The pathogen can only be detected during the short viremia. As soon as animals show fever, diarrhea and a milk drop, call the veterinarian and send serum and EDTA blood samples from acutely sick animals to the responsible state laboratory — not from animals already recovering.[33]

2. Investigate abortions and malformations consistently. Where an abortion follows clinical signs in the dam, and where the fetus shows malformations of the musculoskeletal system, the whole carcass belongs in the examination. On current knowledge the pathogen is detected as for the Schmallenberg virus, from organ material and above all from brain and spleen.[34]

3. Reduce midge exposure without kidding yourself. Repellents, netting at the openings and increased air movement in the barn reduce exposure. They will not achieve a complete break in transmission.[35] The measure is risk reduction, not a barrier.

4. Review purchases and movements. Clinically abnormal animals must not be moved; quite apart from that, buying in from acutely affected herds during the vector season is an avoidable exposure.[36]

5. Build the group for spring 2027 now. Pull together in one list every cow and heifer that was between day 75 and day 175 of gestation during the 2026 vector season, and monitor their calvings specifically. That list is the basis for everything that follows, and it can only be built from the breeding records, not from memory.

SHAMONDA RECORD SHEET — WHAT BELONGS ON PAPER BEFORE THE 2027 CALVING SEASON

ON THE ACUTE EVENT IN THE HERD

• Date of the first abnormal animal and the date on which the event is considered over

• Number of clinically sick animals relative to herd size

• Daily herd milk volume across the whole period, with a reference week beforehand

• The date on which the previous production level was reached again — or a note that it was not

• Cullings and secondary disease during and after the event, each with the reason for culling

• Visit, feeding and activity data as far as the herd management system provides them, plus the extra labor time incurred

• Results: date of sampling, sample material, result, variant detected

ON THE GROUP WITHIN THE ASSUMED VULNERABLE WINDOW

• Breeding date and day of gestation at the time of the herd event, for each animal

• Sire and mating, to rule out a genetic misreading of later malformations

• Expected calving date

ON THE 2027 CALVING SEASON

• Every abortion and stillbirth with gestation length and findings · • Every malformation with a description and the examination result · • Dystocia rate and calf losses compared with the three previous years

The comparison with previous years is the real point: without a baseline, in the spring of 2027 neither a cluster nor an all-clear can be substantiated.

This list does not replace diagnostics. It makes sure the diagnostics reach the right animals in the spring of 2027.

Conclusion: put it in context, document it, do not extrapolate

In the summer of 2026 the Shamonda virus triggered an acute herd event in central Europe that, in speed and in loss of production, is clearly beyond what was documented in 2011 and 2012 for the Schmallenberg virus. No direct deaths are reported in the published surveys; from practice, however, there are accounts of cullings from secondary disease and of herds that are still not back at their old production level after six weeks. What is documented is the clinical picture, transmission by midges, the presence of two independently introduced variants, and the genetic proximity to the Shamonda virus known since the 1960s. What is not documented is what happens to the pregnancies. The assumed vulnerable window is transferred from the Schmallenberg virus, not measured for the Shamonda virus. Whether and how often fetuses are damaged will become apparent in the 2027 calving season and not before.

For the farm that means three things. First: diagnostics are possible during the acute phase and not afterward — the window is short and it does not come back. Second: moving breeding was moot for 2026 in the affected regions, but for 2027 it is a real decision, and one to be backed with numbers rather than with feel. Third: what counts now is documentation. Anyone who wants to demonstrate or rule out a cluster in the spring of 2027 needs the baseline from previous years and the assignment of every affected pregnancy. Both are created now or not at all.

And one structural point remains. That the information lagged behind the event is no communication failure by individual agencies, it is the consequence of there being no mandatory data flow for a pathogen that is not listed. As long as surveillance is purely passive, the next introduction of a vector-borne pathogen will take the same course. With three orthobunyaviruses of the Simbu serogroup circulating and the possibility that they exchange genome segments among themselves, that is not a theoretical worry.[37]

What can be demonstrated in the spring of 2027 is decided by the records kept in the autumn of 2026.

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MARKET & MARKETING · TECHNICAL ARTICLE

Understanding elite auctions

What makes an elite auction sound in economic terms – and why the highest bidder often pays too much

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Elite auctions are seen as a shop window for genetics. In economic terms they are something more precise: a mechanism for finding a price under uncertainty. Understand that and you can see why record prices are rarely the market value, why a complete catalog is not generosity but the seller's own commercial self-interest – and why the most important buying decision is not made in the ring but before it. This article brings auction economics, behavioral research and consulting practice together into one clear picture, with two DairyTalk checklists to take away.

Starting point: more than a knockdown

The new elite auction season is beginning. For weeks, catalogs get studied, animals get inspected and budgets get planned. For many breeders, elite auctions are the high points of the year – places where genetics, emotion and the market meet. They set price references, shape the reputation of cow families and sire lines, and influence breeding decisions far beyond the day of the sale.

It is precisely where high prices and high expectations come together that a sober look at the mechanics pays off. A record knockdown is no seal of quality, and the highest price is not automatically an animal's market value. Over the past months I have analyzed numerous German elite auctions, worked through price patterns and gone into market psychology, price formation and buyer behavior. The result can be stated up front: understand the economic logic of an auction and you buy better – ignore it and you pay for it.

> Anyone who wants to understand elite auctions has to look at more than the knockdown. He has to understand the mechanism behind it.

KEY POINT

an auction is not a shop window, it is a procedure for finding a price under uncertainty.

What an auction does in economic terms: price discovery

An elite auction in its usual ascending form is a price discovery procedure: the price rises until only one bidder is left. The knockdown therefore sits roughly one increment above the willingness to pay of the second-highest bidder. The price does not measure what the animal "is worth," it measures what the last-but-one interested party was still prepared to pay. That is an important distinction, because it explains why two almost identical animals can fetch very different prices – depending solely on who happens to be in the room.

Economists distinguish two basic types of value. Under private value, each bidder values the animal for his own use: a dairy farmer works out what the cow will do in his barn. Under common value, by contrast, the value depends on a future quantity that is similar for everyone but unknown – the future demand for a bull dam's genetics, say, or the market value of the embryos under a contract. This is where it gets genuinely interesting, because elite genetics are predominantly a common-value good.

The price never tells the whole story – it only reveals the second-highest bidder's willingness to pay.

KEY POINT

elite genetics rarely have a private value; they usually have a common, uncertain future value – and that changes everything.

The winner's curse: why the highest bidder often pays too much

When the true value of an animal is similar for everyone but unknown, every bidder estimates it with an error. Some overestimate it, some underestimate it. Who wins the auction? Systematically, the bidder whose estimate deviates furthest upward. The knockdown therefore goes not to the person with the best assessment but to the person with the most optimistic one. This phenomenon is known as the winner's curse – first described by Capen, Clapp and Campbell (1971) for oil leases and later classified by Thaler (1988) as a systematic bias.

For elite auctions that means the spectacular record price often marks not the market value but the estimate of the most optimistic – or the most emotional – bidder. That is no reproach to individual buyers, it is a structural property of the procedure. The most effective protection against it is uncomfortable but simple: do not bid the resale value you are hoping for, bid the sober value to you – and deliberately shade your own bid downward, particularly when many others are bidding too.

> The person who wins in the ring has often not judged the value best – he has overestimated it most.

KEY POINT

the more uncertain the value and the greater the competition, the more consistently a rational bidder has to shade his bid.

Why transparency raises the proceeds – and does not only benefit the buyer

Here lies perhaps the most important insight, because it is the counterintuitive one. A complete, honest catalog is usually understood as fairness toward the buyer. In economic terms it is far more: it is in the seller's immediate interest. Milgrom and Weber (1982) showed with what is known as the linkage principle that a seller who credibly commits to disclosing all available information achieves higher proceeds on average.

The mechanism is this. Bidders who fear the winner's curse build a safety discount into their bids – they bid more cautiously because they price in uncertainty. The more dependable information the seller discloses, the smaller that uncertainty becomes and with it the discount. Bidders bid more confidently and higher. A complete catalog – national and international breeding values, traceable performance data, unambiguous identification, transparent embryo and stud contracts, current photographs – therefore does not lower prices, it stabilizes and raises them. Selective advertising, by contrast, breeds mistrust and with it exactly the caution that harms the seller.

Transparency is no act of nobility by the organizer – it is the cheapest way there is of turning trust into proceeds.

> **KEY POINT**
>
> **an honest catalog lowers the bidders' uncertainty – and lowering uncertainty raises the bids.**

Selection, information and trust: the game gets repeated

Elite means not only high genetics but a selection that can be followed. Buyers and consignors should be able to understand why an animal was accepted, on what criteria the selection was made, and how regional and outside consignors are treated. In economic terms this is a question of repeated games: an auction is not a one-off event, it is part of a series. Give the impression once that information is being released selectively or too late and you pay for it next time with more cautious bidders.

That is why a fair information policy is central to being taken seriously. New information does not belong in the ring for the first time. Short-notice updates are sometimes unavoidable, but essential information has to reach all buyers early enough for them to weigh it in peace. Information that only comes out as the animal is called in has formally been disclosed but is practically worthless – and it damages the trust the next auction lives on. The same goes for clear roles: organizer, auctioneer and marketer should act transparently and name conflicts of interest openly.

> Reputation is an auction house's real capital asset – built over years, thrown away in an afternoon.

> **KEY POINT**
>
> **trust does not come from spectacular animals, it comes from decisions that can be followed – time after time.**

The psychology of the ring: anchors, mood, escalation

Even well-informed buyers do not decide purely rationally. Behavioral research knows three forces that act particularly strongly in the auction ring. First the anchoring effect: Tversky and Kahneman (1974) showed that once a number has been named – the opening bid, an estimate, an earlier record – it shifts the assessment that follows, even when it is factually irrelevant. Ariely, Loewenstein and Prelec (2003) went further and demonstrated that even arbitrary starting values measurably shape willingness to pay.

Second, auction fever. Ku, Malhotra and Murnighan (2005) described how rivalry, time pressure and the social stage of the ring produce a competitive arousal that drives bidders past their own limit. Third, escalation of commitment: having bid once, a person does not want to stand there as the loser and puts in another bid to “rescue” the first. All three forces have the same effect – they detach the buying decision from the calculation. And all three can be defused with a single tool: a binding price limit set before the auction.

Emotion belongs in an auction – it only becomes dangerous when it replaces your own calculation.

> **KEY POINT**
>
> **the ring is built to move limits – which is why the limit has to be fixed beforehand.**

The buyer: strategy beats mood

What a buyer should watch for follows directly from the mechanics. First he has to know what kind of buyer he is: a dairy farmer, a breeder, a program buyer or an investor will value the same animal completely differently, because their value arises differently – for one privately, out of what she does in the barn, for the other in common, out of the future genetics market. The biggest mistake is buying an animal on someone else's motives. Bid, as a dairy farmer, against an investor's resale dream and you have bought yourself straight into the winner's curse.

The single most effective measure is therefore the limit set in advance – not as rough guidance but as a self-binding commitment. It is set at home, before the auctioneer calls the animal in, and it is kept. The best self-test for it is a single question: would I buy this animal at the same price if there were no auction today? If the answer is no, the price is a product of the ring and not of the value. The surroundings belong in the assessment too: who is in the room, which buyer groups are represented, and whether bidding is more rational or more emotional often influences the knockdown more than the genetics do.

> The most important buying decision is not made in the ring, it is made at home – in your own calculation.

KEY POINT

do not buy the loudest animal. Buy the animal that fits your strategy.

Valuing contracts properly: option value, not hope

Embryo and stud contracts can raise an animal's value considerably – but they do not replace it. In economic terms a contract is an option: a claim on a future, uncertain return. Its value depends on how realistic the underlying assumptions are, what risks exist, and whether there is actually demand. A contract for embryos with no market for them has no value, however impressive it reads on paper.

The test is therefore whether your own calculation rests on dependable quantities or on assumptions and hopes. Count a contract into your price limit as certain income when it is in truth an uncertain option and you systematically overestimate the animal's value – another way into the winner's curse.

A contract can raise the value – but only if there is real demand behind it.

KEY POINT

value a contract as what it is: an option on an uncertain return, not certain income.

Before the knockdown comes the preparation.

Credibility as an auction's capital

The economic effect of all these principles cannot be read off a single knockdown. It shows in the overall picture of an auction across the years: in the number of returning buyers, in the stability of prices, in the willingness of good consignors to market their best animals here in particular. An auction that goes for short-term records and sacrifices transparency or fairness for them wins an afternoon and loses a reputation. An auction that protects trust builds capital that pays out afresh every season.

That closes the circle back to economics: with elite auctions, integrity is not a moral extra, it is the condition on which the price discovery procedure works reliably at all. Buyers have to trust the price formation, and sellers have to be able to trust that they will be marketed under fair conditions. Where that double trust is missing, the auction becomes a lottery – and lotteries attract the wrong bidders in the long run.

> In the long run it is not the loudest auction that wins, it is the most credible one.

KEY POINT

credibility is not a soft value – it is the precondition for prices meaning anything at all.

Conclusion: from the knockdown to understanding

Elite auctions are an indispensable part of modern cattle breeding: they bring breeders together, create attention, encourage innovation and set impulses for the whole industry. That is exactly why they deserve the highest professionalism – and an audience that understands their mechanics. You do not recognize a sound elite auction by individual record prices, you recognize it by transparency, fair information and traceable price formation coming together.

For buyers all of this condenses into one simple principle: know the logic of the procedure and you will not let the ring take the calculation out of your hands. The two checklists that follow sum the article up for practical use – meant for printing out or for looking up on a phone, right in the middle of an auction.

10 marks of a sound elite auction

1. A transparent sale catalog

All relevant information – breeding values, performance data, health status and contracts – is published in full and in good time.

2. A selection of animals that can be followed

The criteria for acceptance into the sale are clear and comprehensible to consignors and buyers alike.

3. The same information for every buyer

Essential updates are communicated early and not announced for the first time in the ring.

4. Clearly separated roles

Organizer, auctioneer and marketer act transparently and professionally. Conflicts of interest are communicated openly.

5. Price formation in line with the market

The auction produces traceable prices that can serve as a reference for the market.

6. Professional organization

A punctual schedule, good presentation of the animals, clear information and a structured sale process.

7. Emotion in proportion

Atmosphere and excitement are part of it – they should support rational buying decisions, not replace them.

8. Fair competitive conditions

Every buyer has the same chance, every seller is treated by criteria that can be followed.

9. Credibility instead of chasing records

Not every top price is a success. What counts is long-term trust in the market.

10. Respect for buyers and consignors

A sound elite auction sees itself as a partnership with breeders, buyers and the whole industry.

The highest price is one opinion, not a market value.

10 questions before the first bid

1. Why do I want to buy this animal?

For my own herd, for breeding, for a program, or as an investment?

2. Does the animal really fit my breeding strategy?

Or am I being carried along by the mood?

3. Have I gone through the catalog in full?

Breeding values, performance data, pedigree, health traits and contracts.

4. Is the price being called still economically defensible?

Not only today – but in two or five years as well.

5. What really makes this animal special?

Scarcity, the cow family, the genetics – or just the attention she is getting right now?

6. Are there comparable alternatives?

The more easily an animal can be replaced, the more strictly the price limit should hold.

7. Is the contract on offer genuinely worth something?

Or does my calculation rest on assumptions and hopes?

8. Have I set my personal price limit in advance?

And am I prepared to hold to that limit?

9. How is the auction environment influencing my decision?

Mood, competition and momentum can influence the knockdown more than the genetics do.

10. Would I buy this animal at the same price without an auction?

If the answer is no, that is often the clearest warning signal there is.

The DairyTalk rule of thumb

The best purchase is not the most spectacular one – it is the one you can still explain with conviction the next morning.

Not every expensive animal is worth the price. But every good deal begins with a clear decision – not with a spontaneous bid.

KEY POINT

in the long run the value of an elite auction comes not from its highest prices but from its highest credibility.

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MARKET & MARKETING · PRACTICE

Four buyers, four pricing logics

Who bids at the 2026 Holstein elite auctions, what gets paid for, what goes unsold – and how to cap a bid

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Four buyers sit in the same room looking at the same animal and are prepared to pay four completely different prices for her. So if you want to explain a knockdown, you do not need to read the catalog, you need to know who is bidding. This article describes the four buyer types that carry the Holstein auction market, sets out their willingness to pay in ratios rather than in euro amounts, and lays out a procedure for setting your own limit before the day of the sale. The typology comes from consulting practice. The orders of magnitude have been checked against the published results of German auctions and are marked as dated examples, not as a market forecast.

Who bids at Holstein elite auctions, what gets paid for, and how to set your own limit before the ring sets it for you

Two markets, one ring

There is not one auction market for Holsteins, there are two, and they share a ring. One trades use value: animals that are meant to give milk, in a barn whose accounts hang on the milk price. The other trades options: animals that are meant to become something – a line, a route to market, a trait that is scarce. The two markets respond to different signals. That is why auction averages are so hard to read and why two bidders can value the same catalog completely differently.

The use market follows the milk price, and it does so with no appreciable delay. When the payout falls, willingness to pay for a fresh heifer falls, because the same liter has to pay for the purchase. That is not sentiment, it is arithmetic, and it can be traced through every price drop – most recently between the summer of 2025 and the summer of 2026, when the German producer price gave up around a quarter and fresh heifers at the regular breeding stock sales were valued correspondingly defensively.[1]

The strategy market does not follow it. Anyone buying an animal to make embryos, daughters or a market position out of her is not calculating with this year's milk price but with the availability of comparable genetics over the coming years. Both stand side by side in the same auction, which is why an overall average can look stable while everything underneath it shifts. In January 2026 the overall average at a Westphalian elite auction was 7,195 euros, almost exactly the previous year's figure.[2] What had changed was the composition: the most expensive calf gained, the middle of the genomic offering gave up around a fifth, and the fresh heifers did not move at all.[3]

The practical conclusion: an average price is worthless for your own decision until it is clear which of the two markets it came from. And the question of what an animal is worth has no answer without the question of who is supposed to buy her.

The ring trades two different goods. Only one of them is milk.

A measure that holds up across the years

Euro amounts date quickly, because they move with the milk price, the feed year and the mood. What lasts longer is the ratio between the segments. Take the freshly calved heifer at the regular breeding stock sale as the unit and the rest of the market can be measured against her – and that ladder stays readable even when all the rungs shift up or down together.

Calculated: the published results of the 2026 season give the following ladder. It is the author's own ratio calculation based on the auction figures documented in the footnotes, not a surveyed market value.[4]

0.5 × an embryo at the average of an elite catalog.

1.0 × the freshly calved heifer at the regular breeding stock sale – the unit everything else is measured against.

1.7 × the same kind of animal, but bought at the elite auction. The premium is the price of pedigree, catalog and selection.

2 to 4 × the most expensive fresh animals at an elite auction. This is where what can be achieved with type and cow family ends.

around 4 × the genomic young female at the average of the elite catalog.

10 to 13 × the top lots at an elite auction. This rung no longer shares a scale with the ones below it.

The ladder says nothing about the absolute level. It says something about the gaps, and the gaps are the real information: between the commercial buyer and the program buyer there is not a premium, there is an order of magnitude. See both side by side in one catalog and value them on the same scale and you will inevitably get it wrong – in one direction or the other.

Two caveats belong with it. The ladder is calculated from one season and is not a multi-year average. Whether the gaps stay constant over longer periods is not documented for the German auction market, because there is no public time series for it. And it shifts as soon as a trait loses its scarcity: what costs ten times as much today because it is rare costs three times as much once it is widespread. The ladder is a yardstick, not a constant.

The commercial buyer

He is the largest block of buyers and the one least noticed. His question is whether the animal fits his barn economically, and it is answered the moment he knows when she will have paid for herself. He is buying milk, peace of mind and a return he can calculate.

He is looking for healthy, trouble-free animals with solid production and no extremes in any direction; animals that slot into the herd without special treatment and get along with the milking system he has. Bred animals are often preferable to him over fresh ones, because he can manage the calving on his own farm and does not buy the risk of the first weeks along with her.

He does not pay for brands, contracts, prefixes or promises about the future. An index that tells him nothing about the next two lactations does not move him. On the selling side that is regularly read as a lack of interest in breeding. It is the opposite: it is a very precise idea of which breeding actually arrives in his barn.

His limit sits where the premium over the regular breeding stock market is no longer covered by something that arrives in the barn. That is the best-documented willingness to pay of all four, because it becomes publicly visible several times a month – and it currently sits at about twice the unit when he buys at an elite auction.[5] Above that mark he only buys with a second reason, and that reason is usually a breeding one.

His typical mistake is the freshly calved young cow who looks good in the ring. She brings the full milk price, the full running costs and the loss of flexibility into the calculation immediately, and in a weak milk year she almost never covers her price. Anyone buying in that category should value defensively – not out of caution, but because that is what the arithmetic supports.

The breeder with an eye and a standard

He wants an animal that gives him pleasure and that people notice. His question is not whether she pays but whether she belongs with him. That is not a frivolous category – it is simply a different one, and it regularly gets confused with the first, including by the buyers themselves.

He is looking for type, a known cow family, a prefix with a history, presence and command of the ring. He is buying an animal he can show in two years' time, or whose name he can start a line of his own with. The catalog text counts for more with him than with anyone else – not the index section but the pedigree.

He does not pay for bare index figures, abstract contract structures and anonymous animals. A good average animal with no story leaves him cold, even when all the numbers are right. Conversely, he pays for a story only when he can find it again in the animal: show without type gets nowhere with him, and so does type without a stage.

His limit sits at two to four times the unit, and it is surprisingly firm. That shows most reliably in the top fresh animals, which at elite auctions hardly ever get past that mark – not even with full ring presence and the best presentation.[6] Emotion carries the price, then, but it does not carry it indefinitely.

His typical mistake is the second bidder. An emotional bid needs an opponent to justify itself, and that is exactly what makes it expensive: two buyers who want the same animal for the same reason drive a price neither of them had calculated beforehand. Anyone bidding in this role needs a walk-away limit more urgently than anyone else.

Emotion brings the last twenty percent – and it only brings them if a second bidder comes along.

The catalog decides less than the room does.

The program and AI stud buyer

He is not buying an animal, he is buying an option. His question is what this animal does for him strategically: for a line, for an embryo program, for a route to market, for a position in the market. He is the buyer who explains the top knockdowns, and he is the only one whose calculation reaches beyond the milk price.

He is looking for scarcity in a particular characteristic – polled, red factor, a combination of traits that is rare in the market. He is looking for a female who can be used, because embryos, daughters and a brand can be built from her. And he is looking for a clear profile: not “good at everything” but “very good at this.” That the highest knockdowns of a season all go to young females, and mostly to ones carrying polled, red factor or both, is no accident but precisely this logic.[6]

He does not pay for average, for replaceable genetics or for ambiguity. That is the hardest limit in the whole market: an animal you can get again somewhere else within a foreseeable time is not worth a premium to him, however good she is. He is not buying quality, he is buying unavailability.

Contracts play a particular role for him, and it regularly gets misunderstood. Embryo commitments and stud agreements act as a floor, not as a driver: they secure the price on the downside and prevent collapses, but they do not set off jumps. A high contract sum with no visible scarcity is read as a marketing figure and treated accordingly. That is an assessment from consulting practice – contract structures behind individual lots are not disclosed in auction reports and can be neither proved nor disproved from published figures.[7]

His typical mistake is the young animal whose genomics he takes for a result. The genomic breeding value of a young animal is an estimate with limited reliability that shifts with every additional piece of information.[8] Bid on a young animal and you are buying a probability. In this segment that is not an objection but a quantity in the calculation – but it belongs in the price, not in the hope.

The investor

The fourth type looks at an animal as an asset position. His question is whether a market position can be built from her, and his variables are rarity, international leverage, timing and an exit. He is the only one of the four for whom the breeding question comes second to the financial one.

He is looking for extreme rarity, several serious interested parties in the same window, and demand that does not first have to be created. Sentimental arguments and barn logic do not reach him. On the upside his willingness to pay is not capped, as long as the calculation works out through resale or marketing.

Here the evidence is thinnest. Whether this type actually plays a distinct role at German elite auctions cannot be read off the published reports. The buyers of the top lots are named there as breeding farms, at home and in neighboring countries.[6] Whether program logic or investment logic sits behind them, no report says. Anyone drawing that line is drawing it from knowledge of the people involved – and should say so.

For your own auction day it still matters. A bidder whose calculation does not end in a barn has no limit you can work out. Bid against him and you either win too expensively or you lose – and the second of those is the better outcome.

What all four reward

Different as the four calculations are, six characteristics can be named across the segments that move the price upward. They act additively, and not evenly but with an increasing swing: an animal meeting three of them is not twice as expensive as one meeting one and a half. The list is derived from observed bidding behavior and not calculated from a price analysis.

Scarcity How many comparable animals are obtainable in the next twelve months? If the answer is "several," the price is capped, however good the animal is.

Clarity What does the animal stand for, in one sentence? Anyone who needs three sentences is selling a bundle of possibilities and not a profile.

Strategy Can the animal be hung into an existing program, or would one have to be built first? The second case costs more than the bid looks like.

Scalability How many offspring can be produced in what time, and who takes them? Without a route to market, scalability is a number with nothing behind it.

Low risk What happens if she does not settle, does not flush or does not hold? The price contains that answer, whether it is spoken aloud or not.

Timing Is there a factual reason why the decision has to be made today? If not, it will be made too expensively.

Behind all of it is a common mechanism. An animal does not become expensive because she is better, she becomes expensive because she takes decisions off the buyer's hands. She answers a question he has to answer anyway – which line, what share of polled, which route to market – and she answers it faster and more reliably than he could himself. That is the difference between the fourth and the tenth rung of the price ladder: not the quality, but the number of questions still open afterward.

What gets paid for is not quality. What gets paid for is the number of questions an animal answers.

Before the bid: five checks

The practical consequence is unspectacular: the work happens before the day of the sale. No limit can be formed in the ring; there it can only be kept or exceeded. The following sequence is the version that has proved itself in advisory work; it holds whichever of the four roles you turn up in.

FIVE CHECKS BEFORE THE DAY OF THE SALE

A GENETICS AND DEPTH OF USE

• Is the genomic evaluation confirmed, or is this an animal bought on hope? · • Is the profile lopsided — milk high and fitness weak, for instance?

• Is the logic of use clear — what exactly is supposed to happen with this animal?

• Has replaceability been checked? If she is replaceable, a price cap is essential.

B CONTRACTS AND RETURNS

• Are the embryo and stud contracts realistic — not just high? · • Are the returns achievable in time, not merely possible on paper? · • Is the contract counted as a floor and not as upside? · • Does the contract fit the location and the organization it is made with?

C GET THE CATEGORY OF ANIMAL RIGHT

• Value heifer calves, yearling heifers and young cows separately, not within one price range.

• For fresh animals, price in the current milk price and the running costs.

• Name the loss of flexibility that comes with calving.

In a weak milk year that means valuing freshly calved young cows defensively.

D THE MARKET ENVIRONMENT	• Have you recognized the type of venue — more rational or more emotional? · • Realistically, how wide is the circle of bidders for this particular lot? · • Who is in the room? That matters more on the evening than the catalog does.
E YOUR OWN ROLE	• Am I here as a commercial buyer, as a breeder or as a program buyer? · • Does the animal fit my farm — or the applause? · • Is there a hard walk-away limit, in writing, before the first bid?

Hesitate on any of these points and you do not bid. The hesitation is the information.

From consulting practice: a farm with 180 cows wanted to take two fresh heifers home from an elite auction and had set itself a limit of 5,000 euros per animal beforehand. Both of the animals it wanted went at 5,800 and 6,200 euros; the farm stuck to its limit and drove home empty. Six weeks later it bought four heifers of comparable pedigree at a regular breeding stock sale for 10,900 euros in total, that is 2,725 euros each. Measured against the goal — milk in its own barn — that was the better decision; measured against the catalog it was the duller one. It could only make that decision because the limit was fixed before the day of the sale and not formed while the bidding was going on.[7]

The checks come down to a few questions that can be answered the evening before and no longer in the ring:

- Which of the four roles am I taking on for this lot?
- How many comparable animals are obtainable in the next twelve months?
- What exactly is supposed to happen with this animal in the next three years?
- How much money is lost if that plan does not work out?
- At what price do I walk away – and who on the farm knows that figure besides me?

THE TRAFFIC LIGHT BEFORE THE BID

RED – NO BIDDING HERE

• freshly calved young cows well above what use value supports, with no program behind them

• contract sum above market value, but no scarcity

• “it will go dear, because everyone says so”

• interchangeable PP animals with no strategic role

• emotion beating logic – and you can feel it yourself

YELLOW – ONLY WITH DISCIPLINE	• a rare trait present, but not genuinely scarce in the market · • a good show cow with no international pull · • good genomics, but plenty of alternatives · • a contract in place, the return uncertain · Buy only if the market is not pulling that evening.
GREEN – BUYABLE	• a clear depth of use · • hard to replace or rare · • contract below market value · • the price stays calm · • no pressure to act on your side

The traffic light does not replace market knowledge. It prevents the three mistakes that come up most often in advisory work: buying because everyone says it will go dear; moving a limit while the bidding is running; and switching roles in the middle of the auction.

Conclusion: documented, calculated, open

What is documented is that the segments of an auction catalog move independently of one another. A stable overall average can conceal a marked shift underneath it — in one documented case the middle of the genomic offering fell by around a fifth while fresh heifers stayed unchanged and the most expensive calf gained. It is also documented that the highest knockdowns go to young females and there preferentially to rare combinations of traits.

Calculated, not measured, is the price ladder. It is a ratio calculation based on published sale prices from one season. Auction reports are not market statistics: they describe the animals that stood in the ring on one evening and the circle of bidders who were present. The ladder works as a yardstick for your own bearings. As a forecast it does not.

Two things remain open. Whether the gaps between the rungs are stable over several years cannot be decided without a public time series — and none exists for the German auction market. And whether program logic or investment logic sits behind the top knockdowns is not apparent from any auction report. Both are questions that can be answered with market knowledge but not with data — and should be labeled accordingly.

For the day of the sale itself that changes little. The decision is not made in the ring, it is made at the kitchen table beforehand. And it is made better when it is settled in advance which of the four roles you are taking on that evening.

A bidder does not buy the animal standing in front of him, he buys the decisions he will not have to make afterward.

SOURCES (SELECTION)

1 Agrarmarkt Informations-Gesellschaft mbH (AMI), cited in top agrar of April 3, 2026, "Milchpreis 2025: Hoch eingestiegen, deutlich nachgelassen": 2025 annual average for conventional milk in Germany 52.24 cents per kilogram at 4.0 percent fat and 3.4 percent protein including deferred payments, high of 53.51 cents in August 2025, low of 43.45 cents in December 2025 (secondary citation). For July 2026, agrarheute reports 39.40 euros per 100 kilograms in its milk market data. Comparing a monthly figure with an annual average should be read as an order of magnitude, not as an exact measure.

2 Rinder Union West eG (2026): HighlightSALE 2026 – Ein ereignisreicher Abend zum Jahresbeginn. Auction report on the sale of January 9, 2026, RUW-Arena Hamm. Overall average 7,195 euros; genomic heifers and calves 9,880 euros on average; fresh heifers 4,422 euros on average; most expensive calf ZFZ Malawi Red P (a Sainz P RDC daughter) 27,500 euros; most expensive heifer Inside (a Showtime daughter) 5,500 euros. Study population: catalog animals at one elite auction, not a market statistic. The report does not give the total number of lots.

3 Rinder Union West eG (2025): HighlightSALE 2025 – Volles Haus in der RUW-Arena. Auction report on the sale of January 10, 2025. Overall average 7,305 euros; calves 12,410 euros on average; fresh heifers 4,440 euros on average; most expensive calf Easypeasy (a Real Syn daughter) 24,500 euros. The category label differs from that of the following year; whether the category "calves" is defined identically to "genomic heifers and calves" is not apparent from the reports. The direction of the change does not depend on that, its exact size does.

4 Calculated: the author's own ratio calculation based on the sale prices documented in footnotes 2, 3, 5 and 6. The unit is the mean of the two documented average prices for freshly calved heifers at the regular breeding stock sales (2,504 and 2,580 euros, rounded to 2,540 euros). That gives: embryo at the average 0.5; fresh heifer at the elite auction 1.7; most expensive fresh animals 2.2 to 3.7; genomic young female at the average 3.9; top lots 9.8 to 13.4. The calculation rests on one season and is not a multi-year average.

5 Rinder Union West eG (2026): June breeding stock sale in Hamm, auction report on the sale of June 2, 2026, and breeding stock sale in Hamm, auction report on the sale of September 1, 2026. June: just under 140 animals, of which 123 freshly calved heifers at an average sale price of 2,504 euros; top heifer price 4,200 euros (a Mo Red PP daughter). September: 250 animals sold; heifers and cows 2,580 euros on average, yearling heifers 838 euros, breeding calves 463 euros; top heifer price 3,500 euros, most expensive herd bull 3,600 euros for a polled DAY PP son. Study population: regular breeding stock sales, not elite auctions.

6 MASTERRIND GmbH (2026): MASTERRIND EXCLUSIVE – Die Auktion in Verden 2026. Auction report on the sale of February 25, 2026. 62 calves, bred and fresh animals at an average of 7,698 euros; 14 embryos at an average of 1,350 euros; clearance rate 100 percent. Top lots: WEH Sainz Barbara P RC 34,000 euros (buyer within the MASTERRIND breeding region), ZB Race Lana Del Rey Red PP 28,000 euros (buyer in the Netherlands), ZHW Major Tom Batida 25,000 euros (a breeding farm from Lower Saxony) – all young females; most expensive fresh cow Engelkes Ella 9,500 euros.

7 Practical basis: observations and analyses from the author's consulting practice. The amounts given are figures from the farm and are not documented in any publicly accessible source. Farm, personal and animal names are anonymized.

8 Meuwissen, T. H. E.; Hayes, B. J.; Goddard, M. E. (2001): Prediction of total genetic value using genome-wide dense marker maps. Genetics 157(4), 1819–1829. Also VanRaden, P. M. (2008): Efficient methods to compute genomic predictions. Journal of Dairy Science 91(11), 4414–4423. DOI 10.3168/jds.2007-0980. And Hayes, B. J.; Bowman, P. J.; Chamberlain, A. J.; Goddard, M. E. (2009): Invited review: Genomic selection in dairy cattle: Progress and challenges. Journal of Dairy Science 92(2), 433–443. DOI 10.3168/jds.2008-1646. These papers establish the methodology and its limits of reliability; they contain no statements about auction prices.

VIEWPOINT · TAKING STOCK

Cattle breeding 2040

From breed association to genetic infrastructure platform – a picture of the future for German cattle breeding, between preservation and renewal

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When people think about cattle breeding in 2040, the usual question falls short. It is generally: will there still be regional breed associations then? The more important question is a different one: what structure does German cattle breeding need once genetics, data, reproduction, climate requirements, animal welfare and international markets merge completely? The answer shifts the focus – away from the organization and toward the infrastructure. This article first acknowledges what the structures that grew up here have achieved, then names their structural limits, and sets two future scenarios against each other. It is meant as a basis for discussion, not as a finished blueprint.

1. What the existing system has achieved

A serious debate about the future does not begin with criticism, it begins with acknowledgment. The German breeding system is neither an accident nor a backlog of unmade reforms – it is a success model grown over decades that has set international standards. Anyone who wants to develop it further has to understand first why it worked.

Organized German cattle breeding has produced a quality of data, a reliability of parentage and a methodological dependability that the rest of the world envies. Performance recording through the LKV structures — the regional milk recording organizations — the methodologically first-rate genetic evaluation by vit in Verden, the cooperative anchoring of breeders' say in decisions, and the regional roots of the associations are not relics. They are the basis on which genomic selection in Germany works reliably at all.

Genomic evaluation shows this particularly clearly: its accuracy stands or falls with the size and quality of the reference population. That reference population exists only because data were collected in a standardized, monitored and collective way over decades. What is sometimes felt today to be cumbersome is in truth the precondition for the innovations the system supposedly fails to produce.

THE ACHIEVEMENTS THAT HAVE TO BE PRESERVED

• Herdbook quality and parentage reliability at an internationally high level

• Methodologically independent, scientifically grounded genetic evaluation (vit)

• Comprehensive, neutral performance recording (the LKV structures)

• Cooperative decision-making and long-term responsibility for the population

• A reference population that makes genomic selection dependable in the first place

• Breeder culture, junior breeder work and regional identity

KEY POINT

anyone who wants to reform German cattle breeding has to acknowledge first that its greatest strength — reliable, collectively collected data — is exactly the resource every future builds on.

Anyone breeding for 2040 is already working differently.

2. Why the logic that grew up here runs into limits

Acknowledgment does not mean standing still. The same system that worked optimally under conditions of scarce data and regional organization runs into structural limits under new conditions. That is no reproach – it is the normal aging of successful structures.

Today's model is cut for a world in which the decisive data came from milk recording, type classification and pedigree, in which breeding was organized regionally, and in which membership of an association was the natural way into the breeding world. All three of those preconditions are now changing fundamentally.

By 2040 the data that matter for breeding will largely no longer come from classical performance recording but from sensors, milking robots, health monitoring, hoof trimming systems, feeding technology, fertility sensors, methane measurement, genomic profiles, embryo data and the economic figures of the business. The central resource will then no longer be the herdbook alone – it will be the entire data space of an animal across her life.

THREE SHIFTS PUTTING THE SYSTEM UNDER PRESSURE

1. FROM FEW DATA SOURCES TO MANY

• Performance recording was once the main source of data. In future it will be one of many – and no longer automatically the one the association controls.

2. FROM REGIONAL TO GLOBAL GENETICS

• Embryos, semen and breeding values circulate internationally. Regional responsibilities fit a genetics that has gone global less and less well.

3. FROM MEMBERSHIP TO MARKET ACCESS

• Younger farm managers expect data access, open interfaces and a free choice of service provider – not access by way of belonging to an association.

KEY POINT

the limits of today's system lie not in a lack of competence but in the fact that it was built for a data world that no longer exists in that form.

3. The legal framework: protection with a threshold

Every debate about structure in animal breeding takes place inside a clear legal framework. The EU Animal Breeding Regulation (Regulation 2016/1012) governs, across Europe, the recognition of breed societies and breeding operations, the approval of breeding programs, the keeping of breeding books and intra-Community trade in purebred breeding animals and their germinal products. In Germany that framework is made concrete by the Tierzuchtgesetz, the German Animal Breeding Act, which in particular sets out responsibilities for recognition, approval of programs and passing on data.

That regulation serves an important function: it secures quality, transparency and dependability. Without recognized procedures, pedigree certificates, zootechnical certificates and herdbooks would quickly lose credibility. In that sense the legal framework is not an obstacle but a foundation.

At the same time, every logic of recognition creates a threshold in practice. Anyone wanting to run a recognized breeding program needs an organization, access to data, qualified staff, a sufficient population and official approval. Legally, market access is open – practically, it is demanding. This is exactly where it is decided whether animal breeding law mainly secures quality or whether it additionally protects existing structures from competition. The decisive insight: the lever for modernization lies not in breaking with the law but in how the law is shaped. The Tierzuchtgesetz already provides for responsibilities that would make non-discriminatory access and the passing on of data possible.

The core legal question is therefore not: do we need rules? It is: are the rules shaped so that new players, new programs and international cooperation genuinely remain possible?

KEY POINT

good animal breeding law secures quality without cementing the status quo. Modernization does not begin with new legislation, it begins with making consistent use of the openness the existing law already allows.

4. The target picture: an open breeding and data infrastructure

Out of these shifts comes a target picture that is deliberately framed in fundamental terms. This is not about founding another association, it is about creating a shared infrastructure – a kind of common foundation on which different players can work. Four levels can be distinguished.

Level	Function
Level 1 — Open data infrastructure	Standardized, quality-assured, data-protection-compliant consolidation of all breeding-relevant data – from pedigree and genomics through health and fertility to feed efficiency, methane and economic lifetime performance.
Level 2 — Independent evaluation	Functional separation of data holding, genetic evaluation, breeding program, marketing and insemination, to minimize conflicts of interest and secure trust in the evaluation.
Level 3 — Competition between programs	On a shared, verified data basis, several transparent breeding programs compete (efficiency, fitness, grazing, climate, animal welfare, type, organic) instead of one single breeding goal.
Level 4 — The breeder as data owner	The farm keeps control over its data, can see transparently how they are used, and shares in the value created from them.

The decisive conceptual step lies in functional separation. Today one organization frequently combines several roles: it holds data, estimates breeding values, runs a breeding program, markets genetics and advises farms at the same time. Each of those roles is legitimate in itself. Bundled together, however, they create potential conflicts of interest – when the same organization determines which genetics count as valuable and sells those genetics at the same time, for instance.

An infrastructure platform would not abolish these functions, it would decouple them. Data holding, evaluation, programs, marketing and advice would all remain – but as distinguishable, transparently governed functions rather than as a fused whole. That would be a cultural break with the logic that grew up here. But it would also be the precondition for securing trust in a data-driven breeding world over the long run.

> **KEY POINT**
>
> the problem is not the functions of today's system, it is their bundling in one pair of hands. Unbundling creates trust – and in the data economy trust is the hardest currency there is.

5. Two scenarios compared

How German cattle breeding develops by 2040 is not a law of nature, it is a series of decisions. To structure the debate, two idealized scenarios can be set against each other. Reality will presumably be a mixture – but the poles make the choice of direction visible.

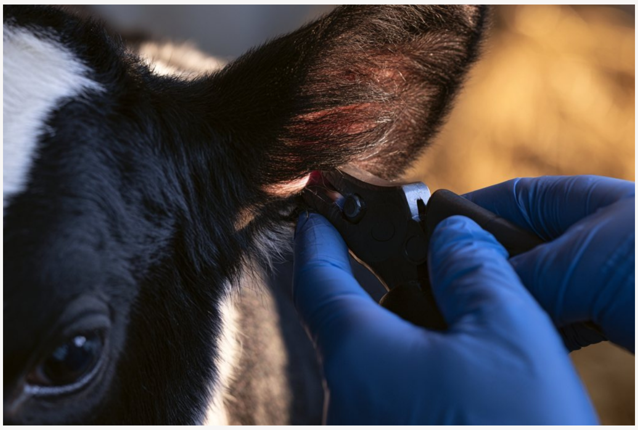
Scenario A carries today's logic forward: the organization remains the center, structures develop incrementally, what has proved itself is preserved. Scenario B shifts the center from the organization to the infrastructure: the platform carries the shared functions, several programs compete on it, and the breeder becomes the owner of his data.

Dimension	Scenario A: carrying on	Scenario B: infrastructure platform
Guiding principle	Organization at the center	Data infrastructure at the center
Data holding	Spread across organizational silos	Standardized, shared data space
Genetic evaluation	Established, close to the organization	Organized as functionally independent
Breeding programs	One per organization	Several on a shared data basis
Role of the breeder	Member and data supplier	Data owner and strategy client
Market access for new players	High barriers in practice	Non-discriminatory access
Pace of innovation	Stable, largely incremental	Higher, competition-driven
Main risk	Falling behind on innovation, members leaving	Complexity, governance effort
Main opportunity	Dependability, continuity	Connectivity, resilience

The comparison makes clear that neither scenario is free of risk. Carrying on (A) offers dependability and continuity – but it carries the risk that innovation increasingly comes from outside and that younger, data-minded farms in particular turn away. The platform (B) offers connectivity and resilience – but it demands considerable governance effort and carries the risk that complexity makes implementation harder, or that the hard-won quality of the data suffers during the transition.

A serious weighing-up does not conclude that A is bad and B is good. It concludes that the choice of direction has to be made deliberately – and should not fall to the status quo by default through a decision never taken.

> **KEY POINT**
>
> the most dangerous option is neither of the two scenarios, it is sliding into Scenario A through a decision not taken – while others build the platform logic anyway.



The sample taken from the calf decides two generations.

6. The role of the breed associations in the platform model

A common misunderstanding in this debate is that an infrastructure platform would make the existing associations superfluous. The opposite is the case. In an unbundled system, specialized, capable organizations become more important – just in more clearly defined roles. Three roles are conceivable, and they can be combined.

THREE WORKABLE ROLES FOR ASSOCIATIONS IN 2040

Role A — Regional breeder community

• Representing members' interests, junior breeder work, shows, farm tours, breeder culture and regional identity. This function cannot be replaced – it carries the social foundation of breeding.

Role B — Advisory and service house

• Support with mating, interpreting data, embryo strategy, selecting animals and marketing. In a data-rich world the need for qualified translation of data into decisions grows.

Role C — Specialized program provider

• Running a clearly defined breeding program with a distinguishable genetic direction – not "we do everything" but "we stand for this strategy."

What is up for discussion in the platform model is something else: the combination of regional responsibility for everything, a historical claim on members, and de facto control over data and market. Not because that construction is improper – but because under the new conditions it brakes innovation more than it carries it. Associations that move early toward clearly defined roles will stand stronger in the new system, not weaker.

KEY POINT

the platform model does not weaken the associations – it forces them to concentrate on what makes them irreplaceable.

7. The question of substance: what are we breeding for in 2040?

The structural question is inseparable from a question of substance. A platform that only did the same thing more efficiently would not be worth the effort. The real opportunity is that an open data infrastructure makes new breeding goals dependably measurable in the first place.

Milk production, components, type and fertility remain important. But they are no longer enough to describe the demands dairy production has to meet. Society is asking for fewer emissions, more animal welfare, less use of antibiotics, higher resource efficiency and transparent food production. Those demands can only be addressed through breeding if the corresponding data are collected, standardized and translated into breeding values.

Internationally there are already markers along that road. ICAR has developed guidelines for recording sustainability traits such as feed intake, feed efficiency and methane. In North America, health traits and — with Feed Saved — a trait for feed efficiency have already been built into official genetic evaluations; the national data base there is managed by CDCB. Germany would not have to copy those approaches – but it should adapt them more boldly than it has so far. An open data infrastructure would be exactly the instrument that accelerates such an adaptation.

TRAIT DIMENSIONS OF THE COW OF 2040

Established dimensions (remain central):

• Milk production and components, fertility, type, productive life

Growing dimensions (gaining weight):

• Health and robustness, hoof and udder health

• Feed efficiency and use of resources

• Methane emissions per kilogram of usable food

• Suitability for different housing systems (robot, grazing, low-input)

• Suitability in terms of labor, and breeding routes that are ethically defensible

KEY POINT

the cow of 2040 will not be measured against a single index but against how well she fits a society that demands efficiency, health and responsibility all at once.

8. Governance: the conditions of credibility

A shared data infrastructure only holds up if its governance is right from the start. It must be neither a private monopoly nor a government apparatus. The most workable model is a cooperatively controlled, legally secured trusteeship that brings different players in: breeders, the existing associations, AI organizations, the chambers of agriculture, vit, the LKV structures, the scientific community, selected technology partners and independent oversight bodies.

What matters is not the trusteeship alone but that clear principles are binding. Seven principles form the core.

SEVEN GOVERNANCE PRINCIPLES

1. Data belong in principle to the farms that generate them.

2. Use takes place only with transparent, revocable consent.

3. Genetic evaluation is organized and supervised as functionally independent.

4. Algorithms and evaluation methods must be documented in a way that can be followed.

5. New providers get non-discriminatory access to the infrastructure.

6. Genetic diversity is monitored systematically and actively safeguarded.

7. Animal welfare and sustainability traits are at the core of the system, not decoration.

These principles are not an end in themselves. They are the condition for breeders entrusting their most valuable data to a shared infrastructure. Without credible governance any platform stays theoretical – with it, it becomes the anchor of trust for a whole industry.

> **KEY POINT**
>
> **the technology of a breeding platform is the smaller problem. The real challenge is governance that breeders will voluntarily entrust their data to.**

The future is not technology. The future is the next animal.

9. Continuity and break: an honest balance sheet

Radical development does not mean discarding everything that exists. It means distinguishing deliberately between what has to be preserved and what has to be overcome. An honest balance sheet names both.

WHAT HAS TO STAY

- Herdbook quality and parentage reliability
- Neutral performance recording and independent genetic evaluation
- Cooperative decision-making and responsibility for the population
- Breeder culture, junior breeder work, shows, regional identity

WHAT SHOULD BE OVERCOME

- A regional logic of vested rights that forces global genetics into local boundaries
- The mixing of neutral evaluation and selling interest in one pair of hands
- Data silos from which only individual organizations draw benefit
- The single breeding goal – there is no longer one cow for every farm
- Decision structures in which questions about the future disappear into committees

The future is not “everything private” against “everything association.” That opposition leads nowhere. A workable future combines four elements: an open infrastructure, fair competition between programs, strong breeder rights, and a clear, collectively carried responsibility for the population and for the animal.

> **KEY POINT**
>
> **the reform will not succeed through demolition, nor through preservation at any price, but through an intelligent distinction between what carries and what brakes.**

10. The political core – and the real question

In the end the structural question in cattle breeding is a political one. Put sharply: does Germany in 2040 want to administer a protected association-based breeding system – or shape an open infrastructure for genetic innovation? Animal breeding law has to secure quality. But it must not lead to structures that grew up here automatically acquiring a right to the future merely because they were successful historically.

That question will not be decided in a single resolution but in many smaller points of the switch: in how recognition procedures are shaped, in the question of data access, in the willingness of established organizations to unbundle functions, and in whether the industry shapes the platform logic itself or has it shaped for it from outside.

From breed association to breeding platform. From member to data owner. From one breeding goal for all to a diversity of genetic strategies. From a protective wall to an open quality infrastructure.

When we look back in 2040, the decisive question will not be which organization survived. It will be whether German cattle breeding understood in time that its future lies not in protecting old structures but in the intelligent reordering of data, genetics, responsibility and competition – on the foundation of exactly the data quality the old system so creditably built.

Did we grasp in time that the strength of the existing system — its data — only becomes a future if we open it up instead of administering it?

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Read or listen? For me that was never really an either-or question. From the start, what I wanted with DairyTalk was to create one more way of engaging with cattle breeding, the dairy business and the future of our industry. Not everyone still has the time and the quiet in the evening to read a long technical article. In the car, in the tractor, at milking, on the way to work or out for a walk, it looks different.

DairyTalk is not meant to be a news channel that simply reports what has happened somewhere. What interests me is usually the question behind it:

So when we talk about genomic selection, it is not only about new breeding values. It is about how we use genomics sensibly and where its limits may lie.

When we talk about Holstein breeding, it is not only about the next top sire. It is about function, production, type, longevity, genetic diversity – and again and again about the question of which cow we actually want to breed for the future.

BETTER BREEDING STARTS WITH BETTER DECISIONS.

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