The importance of observing cow behaviour to improve performance

Behaviour in the dairy context is defined as the way an animal behaves, especially towards other animals and how it behaves or functions in a particular situation.

by Dr Susanne Klimpel, GEA Farm Technologies GmbH. gea.com

In the field of veterinary diagnostics, behaviour observation and evaluation is one of the first and major points that are considered during the examination.

Before even touching the animal to measure temperature or for auscultation the cow's behaviour offers the first guide to the severity and origin of disease.

Farmers and herdsmen are constantly and subconsciously observing the behaviour of their herds, groups and individual cows.

With a single glance, experienced herdsmen will recognise all different kinds of behaviour:

- Is the cow eating properly, long enough or is she leaving the feeding area after a short time to lie down?
- Is she still resting when all the others are getting up for milking?
- Is she walking slower and less often?

Feeding time in particular serves as a good differentiator to distinguish cows with regular behaviour from those who are, for example, not getting up at feeding times. Very often this is associated with a health issue. The other extreme is cows in heat who also might not be eating and instead are walking or running around.

If a cow has been identified with abnormal behaviour the next steps to be considered include further examination, measuring temperature and taking samples for further analysis.

The way the behaviour has changed will give a hint to the cause but will not lead to a diagnosis.

As a summary, human observation is a key driver to identify animals at risk. The success of this is highly dependent on the training and ability of the observer and the time that is available. Therefore, the number of correctly identified animals at the right time varies a lot.

Behavioural changes

Cows in heat show a very specific change of behaviour, such as restlessness, and are easy to identify.

Behaviour observation for identifying cows in heat has been automatised with the help of pedometers for decades. This has led to an increase in heat detection rates.

The possibility of being able to monitor cow behaviour 24/7 is one major cause of these good results. These systems work in a consistent way and therefore, in contrast to different people working on the farm, they offer more reliable information.

As the heat detection technology is considered to be mature, the identification of animals at risk with the help of technology is the next step in automatised behaviour observation: identifying health disorders and treating them early contributes a lot to increasing cow's lifetime and profitability on farm.

Fig. 1. Herd management support with CowView.

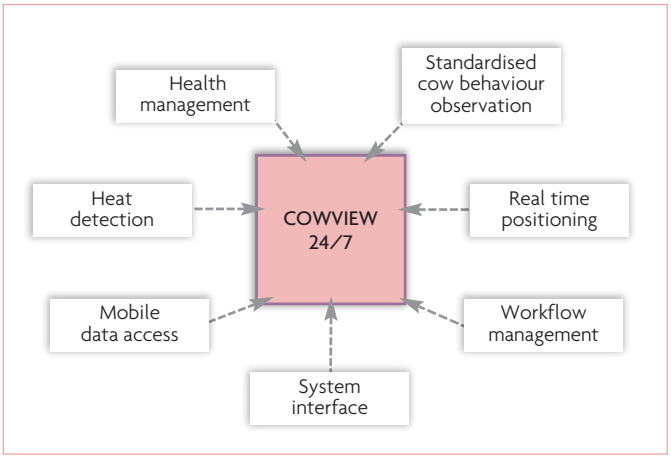

Fig. 2. Behaviour observation using CowView: duration, frequency and walking distance are continuously analysed.

Distribution of costs

The crucial part of every disease event that happens on a farm is that it causes extra work and economic losses.

The costs associated with diseases are often underestimated and the distribution of these costs is not very obvious.

Identifying the cows at risk is the prerequisite to address this topic.

24/7 behaviour observation offers huge opportunities in this respect:

- **Consistency:** Technology is able to analyse the data continuously in a defined way.
- **Security:** Technology can offer a deeper insight as more specific information is available. Behaviour can be measured not only in total duration but frequency and bout duration information is available now as well.
- **Reliability:** Reliable and validated technology delivers high quality information.
- **Comfort:** Supporting farm management by identifying cows at risk (Fig. 1).

Researchers have been looking at changes in behaviour with regard to diseases like lameness, metritis and ketosis and many more.

Individual studies are so far focusing on one specific behaviour, such as eating, and identifying changes in regard to one specific disease. This also depends on the technology that is used and available.

Studies have identified changes in eating behaviour and an increase in lying time and bouts in lame cows.

Walker et al. (2008) did not find any changes in drinking, ruminating and grazing time in lame cows.

So far no studies have looked at a wider range of behaviours and their changes over time during a specific disease.

Additionally, so far no system was available to measure the walking

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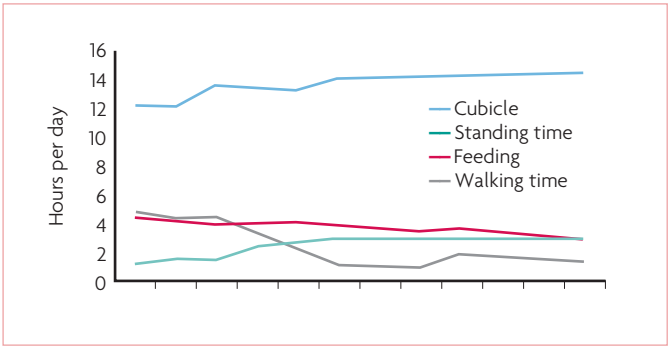

Fig. 3. Changes in behaviour in a lame cow: standing, eating, walking and resting.

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distance. As lame cows tend to make smaller steps the pedometers might mislead and indicate lame cows at a later stage when the activity drop is more significant.

We see a great potential in the possibility to get a deeper insight into multiple behaviours using one sensor only.

To mimic what experienced herdsmen and veterinarians are doing we do need a broader approach to be able to identify health issues on a wider range.

The compromise might be that the indication is not as specific but the advantage is that affected animals are properly identified.

One approach to this is analysing multiple behaviours and their change over time – the circadian variation.

An holistic approach

GEA CowView, a real time location solution (RTLS) technology uses the very simple methodology of cow behaviour observation in a holistic approach: walking, standing, eating and resting behaviour is observed, analysed and compared to the cow's and the group's history.

Additionally, the total 24 hours duration of these specific behaviours, frequencies and also walking distances are analysed (see Fig. 2). The intelligent algorithms inside GEA CowView generate alarms when the cow's behaviour differs from her normal behaviour.

Fig. 3. shows how the behaviour of a lame cow measured by CowView changes over time.

This cow has increased her time in the cubicle right at the beginning. The walking time has decreased a couple of days later and eating has changed slowly and over a longer period of time. Solely looking at eating might have led to the conclusion that there is no change in behaviour.

The deviation in behaviour should be shown in a user-friendly way providing the necessary information at the right point in time without overwhelming the user with data. (Fig. 4).

With the help of this technology farmers are able to detect cows at an earlier stage and get guidance on how to apply procedures to handle these cows.

Early disease detection and intervention will improve the health status of the herd and contribute to an increased lifetime and therefore profitability. ■

References are available from the author on request

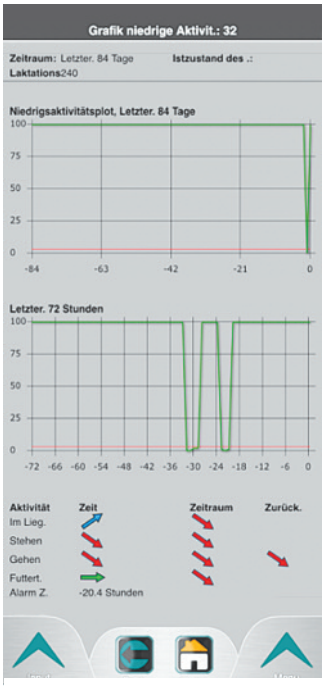

Fig. 4. A display of lame cow behaviour profile in CowView: Lying time has increased, whereas frequency has decreased (longer lying bouts), standing and walking has decreased including walking distance. Eating time is constant but frequency has decreased (longer eating bouts).