

Proper health monitoring to identify transition cows at risk

With increasing herd sizes and a raising number of automated systems on dairy farms, the management becomes more complex and the need for professionalism raises. Modern herd management systems help farmers to monitor and regulate key influence factors of milk quality and quantity, such as feeding patterns, husbandry, breeding, and hygiene.

by Martin Schnare, GEA Germany.
www.gea.com

The goal is a continuous health maintenance and performance optimisation of the dairy herd.

Although modern herd management systems provide a lot of data, they are sometimes lacking the right information for the farmer. Analysing and combining all information to provide the right measures is essential to animal welfare and health.

Furthermore, record keeping and evaluation at the cow level are considered to be very important for monitoring herd performance and making effective herd management adjustments if necessary.

Transit phase

A critical time window in the individual cow's reproductive cycle is the so-called transit phase. Many diseases have their origin within this period in which the cows are prepared for the forthcoming calving and the beginning of the new lactation.

This highly sensitive phase is defined as the period from three weeks ante partum (a.p.; before calving) to three weeks post-partum (p.p.; after calving).

During this period, the metabolism of the cow is subject to strong metabolic and hormonal changes, which initiate the transition from the pregnant to the lactating state.

A significant problem that might occur in this period is the negative energy balance (NEB) p.p., which describes the state of energy shortage.

The capacity for dry matter intake after calving increases only with a delay in relation to the milk yield of the cow.

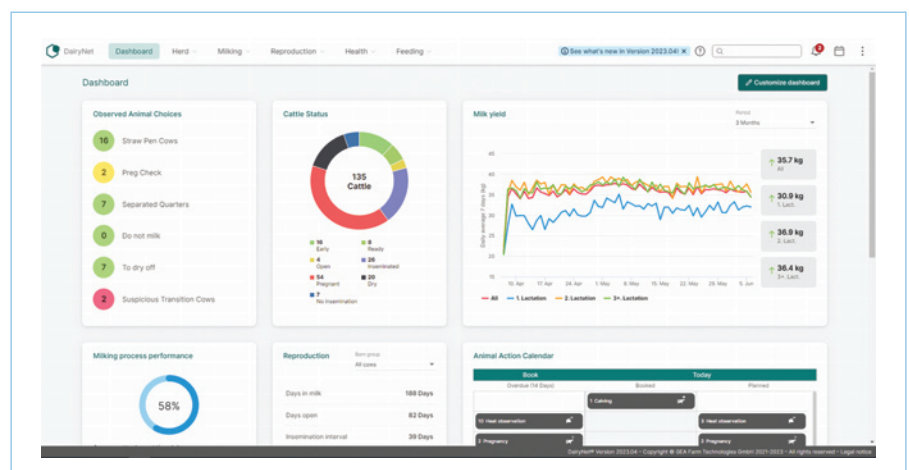


Fig. 1. GEA DairyNet overview dashboard of herd status. Note the observed animal choices widget in the top left with indicating colourings of animal numbers.

Accordingly, the performance requirement must be balanced by breaking down the body's own fat deposits. Commonly, the energy balance is positive again in the period of 50-100 days p.p..

The latter depends on the milk yield and feed intake capacity specific to the individual animal and, in the case of high yields, can also extend beyond 100 days p.p.

Different studies point out that the extent of NEB is positively correlated with the occurrence of characteristic metabolic diseases.

Metabolic diseases

Hostens et al. (2012) examined the effects of metabolic diseases (twin births, milk fever, ret. sec., metritis, ketosis, displaced

abomasum, mastitis) on the course of the lactation curve.

The lactation curves of healthy cows showed a steeper slope at the beginning of lactation and less persistence in the last third of lactation than lactation curves of cows with one or more metabolic disorders.

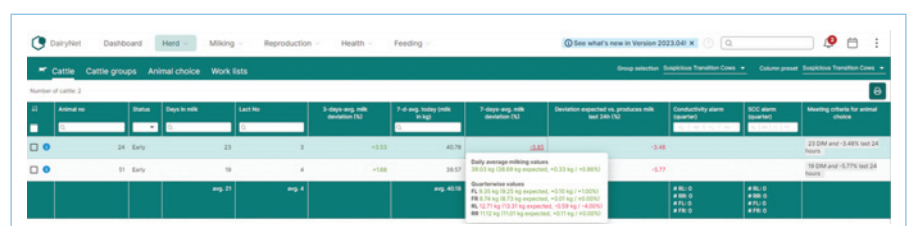
The presence of metabolic disease complexes causes the milk production peak to shift further to the right, ultimately leading to a lower 305-day production.

Cows with more than one metabolic disorder in a lactation lose more milk than healthy cows or animals with only one metabolic disorder.

Furthermore, a lower loss of milk production is to be expected in primiparous cows (first lactation) than in cows with higher parity (pluriparae).

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Fig. 2. Comprehensive health monitoring by combination of sensor data and herd management software.



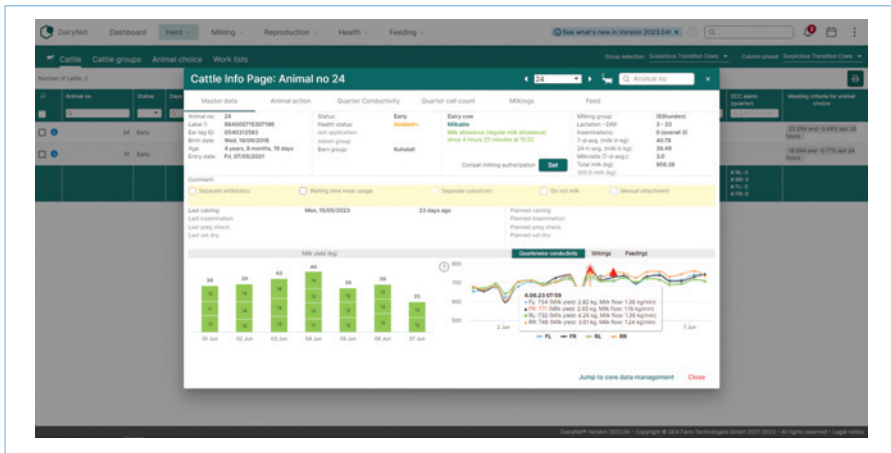


Fig. 3. A specific cattle info page provides further decision making support.

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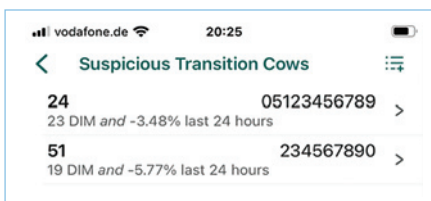
Herd management solutions

It is important that herd management solutions help to successfully manage these production risks in highly sensitive phases such as the transit phase.

GEA DairyNet herd management software offers a user-friendly surface with effective user guidance, adaptable to the individual needs of the respective farm, and ensures the early detection of critical scenarios.

It guides the farmer from the first overview of the herd status via the DairyNet dashboard at the corresponding routine times (Fig. 1) to various control areas of the farm through topic-related widgets. All widgets can be individually arranged

Fig. 4. Single animal choices must always be synchronised between web app and mobile app.



according to the farmer's needs. While monitoring the cows during the transit phase, the 'Observed animal choices' widget plays a prominent role.

It places custom reports on the dashboard. Which animals are displayed by a corresponding report (Animal Choice) is determined by the selection of the corresponding filter criteria.

Depending on how many animals meet the user-defined filter criteria, the corresponding number is revealed in the widget for the associated list. Number colourings give an indication of whether the amount of animals is normal (green), abnormal (yellow) or critical (red).

In the context of transit cow monitoring, it should be easy to select animals, store a self-defined set of columns and place the self-updating report on the dashboard. Since the transit phase extends from the dry period through calving into the respective lactation, both dry cows and cows in early lactation must be considered.

Additionally, activity measurement tags can strongly contribute to effective health monitoring by transmitting corresponding sensor data to the herd management software.

They can be integrated into the reports for health monitoring of the transit phase. The combination of GEA CowScout with milking

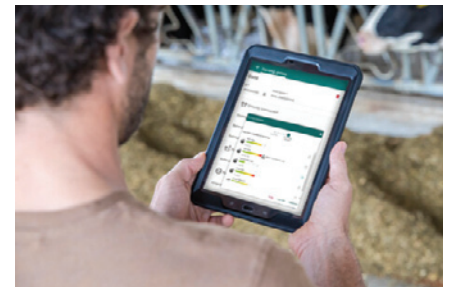


Fig. 5. GEA DairyNet supports a holistic herd management by also tracking critical phases of the individual animal.

and visit data in DairyNet enables a comprehensive monitoring of animals in this critical phase and allows to take the right actions (Fig. 2). If a conspicuous animal is identified using the report, further details are displayed on the animal-specific Cattle Info Page for further decision-making support. In this way, any deviations in performance can be traced (Fig. 3).

Flexibility of dairy farmers also needs to be supported by mobile applications. Therefore, all information, for example the animal choices, needs to be adaptable to synchronisation between web app and mobile app and all results must always be displayed on individual cow level (Fig. 4). This allows for a constant overview of the health of the animals, even from a distance.

Conclusion

A sophisticated management system, such as GEA DairyNet, provides a holistic view of all data related to systems and animals and enable a detailed tracking of the individual cow specifically in critical phases of her reproductive cycle. These detailed analyses give a valuable management support and help to keep up the efficiency and profitability of dairy farms for Next Generation Farming.

References are available from the author on request