The importance of heat stress management for dry cows

In the United States, economic losses due to heat stress are estimated at $897 million for the dairy industry alone, representing an average of $89 per cow. These losses are calculated based on the reduction in milk performance levels but also on the health problems associated with cows in production that are exposed to heat stress.

by Guillaume Desrousseaux, Market Manager, Business Unit Animal Care, Phodé, France. www.phode.com

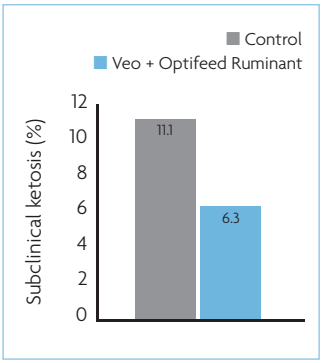
Decreases in production are estimated at between 10 and 70% per lactation, although there are wide disparities between states.

Managing heat stress even for dry cows

Spray nozzles and fans are regularly seen in dairy buildings and/or the pre-milking holding areas.

Various authors have nonetheless demonstrated that implementing such measures to cool dry cows can improve milk performance after calving by 12% compared to a control. This effect is explained by increased proliferation of epithelial cells in the udder 20 days before calving, in cases where the animal's environment allows for better thermoregulation.

Fig. 1. Number of cows with subclinical ketosis (number of cows/100 cows).



Treatments	No. of cows	No. of lactations	Days in milk (DIM)	Accumulated milk production 1-148 DIM (l/cow)	Average daily production 1-148 DIM (l/cow)
Control	44	3.61	146	5,250.4	35.5
VeO + Optifeed Ruminant	45	3.8	148	5,731.4	38.7
Difference				481.0	3.3

Table 1. Zootechnical post-treatment parameters at 148 days in lactation.

Grouping calvings as much as possible is a herd management strategy used to ensure that the dry period takes place during the coolest months of the year.

A comparative study has shown that this management approach has positive effects on both milk production and the number of postpartum digestive and respiratory disorders, as well as placental retention.

Breeding parameters are also improved, with a reduction in the number of inseminations required to impregnate cows (1.51 vs 1.59) and a five-day decrease between parturition and insemination (92 days vs 97 days) and confirmation of pregnancy (126 days vs 131 days).

Another strategy to alleviate heat stress consequences

However, due to the increasing size of farms and the need for a regular supply of dairy products, it is not always possible to apply this strategy, especially in regions where heat stress is present throughout most of the year.

In addition, psychological stress due to dry-off and calving impacts negatively on cow's behaviour and performance.

Based on this analysis, neuro-sensory additives into prepartum feed rations were tested to stimulate appetite under challenging conditions (Optifeed Ruminant) and to regulate the psychosocial stress response (VeO) completing the heat stress management approach to dairy farming.

As with cows in production, heat stress reduces the feed intake of prepartum cows but does not affect their capacity to ingest food at the beginning of the lactation period. Various tests in large herds under heat stress have demonstrated an increase in prepartum dry matter intake (DMI) of about 1kg and a reduction in the coefficient of variation based on the average DMI value of the treated batch (-32%).

It is recommended to continue treatment with VeO and Optifeed after calving to support early lactation and reduce the risk of metabolic disorders (Figs. 1 and 2).

Cows treated during the peripartum period (Parto: P; P-21d to P+36d) produced +4.92 litres of additional milk at 36 days postpartum without any effect on body condition, which was similar to that of the control group.

Heat stress also has a negative effect on placental function during the dry period. Nonetheless, placental retention was reduced by 53% when the VeO and Optifeed Ruminant combination was administered during the calving preparation period (Fig. 2).

A second control of milk production was conducted 148 days postpartum, 112 days after the end of the incorporation of additives into the feed ration. The treated cows produced 9.2% more milk over the period 1-148 DIM.

Consequences on offspring of in utero heat stress

The development of dairy cows in the future will be strongly linked to pregnant cow management, particularly in the latter stages of gestation.

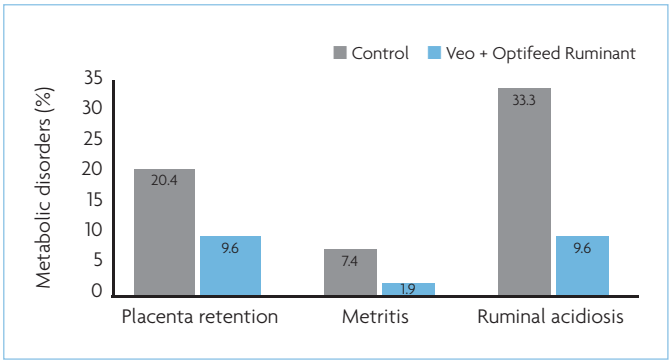
The birth weight of calves relates to the length of gestation. However, heat stress, whether experienced at the beginning of the dry period or during the last three weeks, reduces the number of days of gestation and in particular, of the dry period.

It is therefore advisable to set up cooling facilities from the beginning of the dry period until parturition.

Similarly, a study of 293 pregnant cows under daily mild to moderate heat stress showed that the use of VeO and Optifeed Ruminant three

Continued on page 26

Fig. 2. Number of cows with a metabolic disorder at 30 DIM according to treatment received P-21 to D+36 (number of cows/100 cows).



Continued from page 25
weeks before calving had a positive effect on the weight of the newborn calf (Fig. 3).

This result is consistent with another scientific study in which the body weight of newborn calves was observed to be 5.7kg higher with heat stress management in dry cows. Positive effects on live weight in the weaning stage and during puberty were also observed in this study.

The difference in heifer growth is not related to the quality or quantity of colostrum in treated or untreated cows.

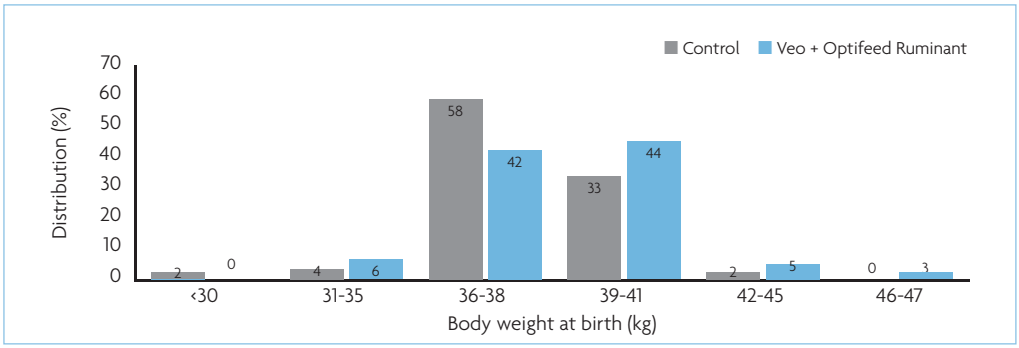
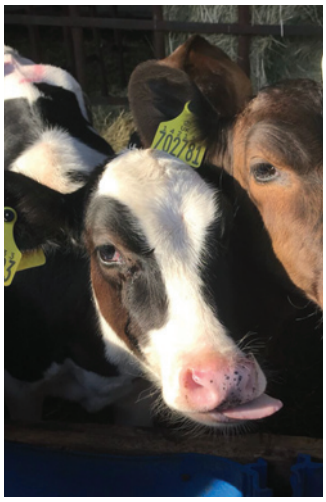


Fig. 3. Distribution of body weight (kg) of calves at birth according to treatment administered to mothers (number of calves/100 calves).



In utero heat stress reduces the apparent efficacy of immunoglobulin absorption in calves and their carbohydrate metabolism, which is correlated with increased fat deposition as the animal grows.

In utero heat stress also increases morbidity and mortality rates in heifers even before their first parturition.

Even if they meet growth and conformation criteria, their reproductive capacities are altered with a significant increase in the number of inseminations (+0.5).

Confirmation of pregnancy subsequently takes place one month later (at 17 months old vs 16 months old) compared to heifers not under in utero heat stress. Finally, milk performance decreases by 5.1kg/d during the 35 weeks after calving.

Negative effects that persist over time

The decrease in milk production of stressed animals in utero continues into the second lactation period: 5kg less milk in the first week.

Thereafter, peak production is achieved later and levels are reduced.

Even in the absence of in utero heat stress, the female calves of these heifers produce less milk, which suggests that the negative consequences of heat stress are potentially inherited from the calf's grandmother.

These results suggest that maternal heat stress during the last six weeks of pregnancy results in a phenotype that will be detrimental to the dairy cow's performance in the future.

In view of the consequences of heat stress on dry cows, as well as on their heifer and offspring, it is important from a zootechnical and economic standpoint to implement all possible measures available to reduce its effects. ■

References are available from the author on request