

# Solutions to reduce the impact of heat stress in your dairy herd

There has been an increasing number of articles concerning heat stress in dairy herds in numerous trade publications virtually worldwide over the past couple of years. A number of sources get the blame for the phenomena:

- Global warming.
- Inadequate ventilation.
- Unadapted bedding solutions leading to increased cow movement and, therefore, the generation of increased internal body heat.
- A cow's natural but very unfortunate inability to dissipate excessive heat by herself.

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There is some level of truth to virtually every one of the above reasons. Science has proven that the earth is gradually getting warmer over time. Ventilation systems are often grossly undersized. Worse yet, they are not a total solution simply because a cow does not perspire as humans do.

Certain bedding solutions may offer short-term comfort but they often retain heat thereby compounding the problem. Last but not least, a cow is still very poorly designed to get rid of excessive body heat and everyone agrees that this will not fix itself.

## Consequences and solutions

It seems safe to say that the dairy community is increasingly aware of the negative impact of heat stress and the frequent articles are additional proof that

the topic is timely and responds to a collective need to better understand both the consequences and the solutions.

The consequences are numerous. Firstly, research shows that heat stress begins at about 20°C (68°), which is much lower than many people had imagined. The addition of humidity amplifies the impact and the cow's discomfort at an alarming rate. It is easy to imagine as we humans generally prefer a dry heat to heat combined with a generous dose of humidity.

A quick look at a THI (Temperature-Humidity Index) chart shows sample measures based on variations in temperature and humidity. The difference between mild

stress, moderate stress and severe stress are narrower than one might think. The results can be devastating and is most often measured in lost milk production.

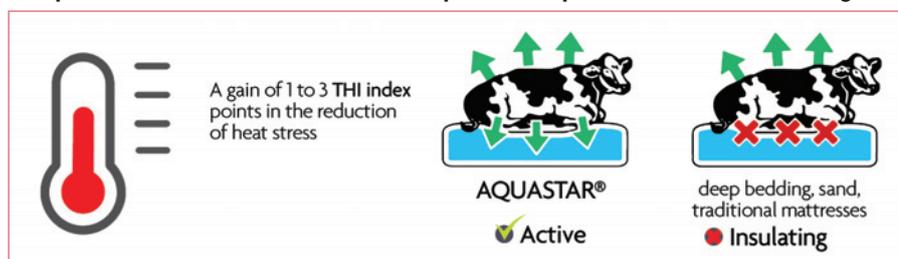
The second consequence of note is that if a cow suffers heat stress long enough and/or severely enough, it is highly likely that she will never return to the production potential that she otherwise could have been expected to achieve. She could very well become 'damaged goods' and no longer capable of paying her way so to speak. Off to market she goes.

The third consequence is in her desire to find a cooler area to lounge in. She moves about excessively, continues to stand to improve the air contact and temperature regulation, which may lead to hoof problems, often eats poorly (consumption also contributes to the buildup of internal heat), becomes lethargic, may not drink adequately to meet her physiological needs and, clearly, starts a downward spiral of suffering. She is battling her environment rather than excelling at producing milk and reproduction of the next future producer that is part of her mission on a dairy farm.

The fourth consequence of note may well

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## Dissipation of the cow's internal heat on Aquastar compared to traditional bedding.



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be the least considered. Scientific research has shown conclusively that heat stress can have a permanent and negative effect on the development of the foetus. That unborn calf suffers as well and chances are good that her potential as a part of the milking herd will be diminished.

While the list may not be exhaustive, these are a number of key consequences that are supported by research that is easily accessible (public domain) on the internet.

Ohio State University has shown that cows benefitting from a cooled bedding solution will increase milk production 2kg (4.4lb) per cow per day. Cornell University compared cooled and uncooled beds and showed conclusive proof that the cows on cooled beds produced 3.7kg (8.1lb) more milk per cow per day.

The University of Florida showed the proven impact of cooling cows to achieve both more milk production after calving as well as the preservation of the genetic capital of the newborn calf that will be a future producer.

To provide an answer to the market need and the growing collective consciousness, Bioret-Agri, a leading French manufacturer of cow comfort solutions with over 25 years of experience in mattress and alley flooring products made a strategic decision to take both product ranges to the next level.

The company re-designed a waterbed that

had been in the range for some 17 years to make it into a top cover, commercialised under the Aquastar name.

### **Taking cow comfort solutions to a new level**

Aquastar is a waterbed but with the advantage of a full foam pad underneath for maximum support of all pressure points and the added advantage of allowing a constant thermal exchange the entire time that a cow is lying on it. Body heat transfers to the water and the pouch is both deep enough and wide enough to allow the heat to escape to the atmosphere. Therefore, the cow is 6°C (10°F) cooler (or more) the entire time that she is on the mattress helping her to battle heat stress. Conventional mattresses, sand and solids entrap the heat and the cow has to move regularly to 'refresh' if she becomes too uncomfortable.

The Aquastar is accompanied by a water filled kneeboard that autoregulates the positioning of the cows. Larger cows needing a slightly longer lying space can push against it and it yields much like a pillow to give her the extra room and comfort that she is searching for.

This is highly advantageous as it helps to maintain proper positioning on the water pouch for the udder and abdomen, thereby affording an optimum cooling effect.

To go yet another step beyond in the fight against heat stress, Bioret Agri has also introduced its Aquaclim Ultimate mattress which is a waterbed similar to the Aquastar Ultimate but with the addition of a series of sealed water channels designed to allow recirculation of water.

By linking the mattresses to a cold water source, we can remove more heat more quickly and therefore cool down the cow more efficiently. In its standard application, the warm water can be dumped or refreshed and continually recycled in a closed loop.

In its thermodynamic version, rewarded in November 2018 with a 3 star EU Innovation Award at Agromek, (Denmark,) Bioret Agri created a zoothermic process by using, via a heat pump, the collected heat from the cow as an energy source for on-farm or other usage.

Energy (heat) recovered from the cows can be captured to heat water, heat the environment and create an eco-energy system available all year long. It is a product that performs well even in the most severe climactic conditions and/or for dairy cattle with very high production potential.

Thanks to Bioret Agri innovation, cow comfort is improved as is zootechnic performance. Waterbeds, foam underlays and a proper ventilation system are keys to providing outstanding comfort and to resolving struggles and financial losses due to heat stress. ■