

Interview with Israel Flamenbaum, Owner of Cow Cooling Solutions, international consultant.

**- What are the main consequences of heat stress?**

R: Regarding milk production, there are different factors, not just volume, but also fat content and protein in the milk and quality of the milk; that means, the somatic cell count that increases when the cow is in that condition of stress.

It also affects fertility, and the effect is an increase of the days open above what is recommended or planned. This happens for two principal reasons. First, heat stress reduces the manifestation of "heat" in the cows and inseminations are lost in those less detected having heat stress during artificial insemination. Second, it lowers the conception rate and both factors, together, extend the calving interval above the optimal level.

**- What are the main signs of heat stress?**

R: There are several. The cow eats less, drinks more water, is less active and searches humid places to try to cool off. The struggle with heat stress can be noticed in an increase of the breathing rhythm and panting as mechanisms to dissipate heat.

Normally, a high-producing cow can't dissipate on its own the heat it generates, therefore body heat rises and that is one of the parameters we use. When it rises, we know the cow is suffering heat stress and the damages begin: decrease in milk production, which is caused mainly by lower food intake of the cow, then also fat content, protein, etc. The cow ruminates less, it tends to stand still to lose heat, it doesn't rest, and when the cow has to be inseminated, it doesn't get pregnant.

**- What advice can you give for prevention and treatment?**

R: First of all, most of our work is preventive. We try to give the best conditions to the cow. Enough shade, sufficient space per cow, we look for facilities to be well aired, with natural ventilation. We give them enough space in the drinkers and fresh food during the day.

We do all this to avoid heat stress, but everything I mentioned can't prevent heat stress when the weather is too hot. The reason is the cow generates great heat, 100 watts per every 4 liters and a half of milk that it produces. For example, a person generates 100 watts and a cow that produces 45 liters of milk then generates 2.500 watts. So a high-producing cow generates the heat of 25 people.

That is why the cow has no chance of dissipate that heat, being a high producer, because it is not something that nature has designed it for. It can't dissipate all the heat it generates in hot weather conditions. If we don't do anything, the cow slows down its metabolism, lowers its food intake, and it will fall to the level of production that allows to dissipate the

generated heat, which is around 10 liters of milk, but that it is not what we expect the cow to produce.

If we want high levels of milk production that correspond to that of the genetic potential of a Holstein cow, for example, that is about 50 liters a day, we have to cool off the cow, provide food, water and shade, and we do that through cooling systems that help the cow lose a lot of heat.

Regarding cooling systems, there are two basic ones. The first, that we call direct cooling, uses fans, cloths, and more than anything the combination of baths with forced ventilation. The other, indirect cooling, is more used in dry climates with vaporized water drops inside enclosed facilities, and the water evaporation lowers the temperature inside the place. These are systems for desertic zones, but do not work as efficiently in humid zones. Most of the projects that I work on are in relatively humid zones, so the direct cooling system is the one that I use the most in my work.

**- What are the conditions to apply direct cooling and how much of it is automatic?**

R: The cow generates heat all day, so treatment has to be continuous, every day. It has to be frequent so the body temperature of the cow lowers to normal and it stays fresh.

The combination of water and ventilation is automatic, it works with timers, but the human part is to take the cows to the treatment, a number of times during the day, and for that there is no automatization, we do it with hired personnel.

In different barns, and this is part of the profession, you have to decide what type of cooling locations to use and in what conditions, but regularly we have three main locations to cool off the cows.

One is the holding pen, where the cows are gathered to be milked, and we use it to cool them off. Sometimes it is not enough the time that we give them for it in this location, because of how fast the milking process is, so to extend cooling time we build special tunnels in the entrance and the exit.

If we milk the cow three times a day, it means that we cool it off every 8 hours, but a high-producing cow requires to be cooled off every 4 hours. To be able to do this, then we have to give them treatment between each milking, which can be done in tunnels between pens, to minimize the distance the cow would have to move, or in the feedstalls, and then you can cool them off while they're eating. The decision of where and how to do it is taken in each production unit according to the specific conditions of it.

**- You have researched Summer to Winter ratio. ¿What would be a good ratio?**

R: I take the hottest three months of the year and the coldest three ones to do it, taking in account the average production of the cow for those periods. In successful barns, that ratio

is up to 95, 96 even 98 per cent. In the barns that are failing or not cooling enough the cows, the ratio can go down to 80 per cent in the summer. Extreme cases have shown 70 per cent, so the loss goes up to 30 there. And I have also gone to very, very hot places in the world, like southeast Asia, Vietnam, Thailand, south of China and even Central America, with european cows, where I have even seen a 50 per cent ratio.

**- Do you think there is noticeable improvement in cooling around the world?**

R: I think that only a very small part of the countries where there is an intensive dairy cattle activity, with pure and specialized breeds, manage to do it. So I believe there's a lot to be done with this issue, which is relatively new. Wherever I go, people try to cool off cows, but very few of the barns accomplish it because it is not well done or they don't follow the requirements.

We also need to remember that, even though what we do is try to help the cow, its well-being and health, this is a business and people have to make a living out of this, so the economical aspect is important. In every project that I'm involved with we have to calculate costs and benefits. We have to consider the economic potential of cooling cows and I consider it the most profitable investment for a producer in warm weather. In most cases, the net income per cow a year is doubled. This helps increase profits. The return of investment can be full in two years and there are cases of only one year.