

## Reducing Heat Stress in Hutch Calves

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*Looking for a simple way to help hutch calves cope with summer heat stress? In a trial we conducted Summer 2011 in Central Washington, we tested one method to try to improve air circulation within calf hutches to reduce hutch temperatures.*

Why look at heat stress remediation? Heat stress affects calf health, growth and welfare. The calf's 'comfort zone' is fairly narrow and temperatures above 90°F with moderate humidity can put calves under stress. Studies looking at different types of housing show that some hutches are better than others at keeping temperatures down by providing shade, but many calves are still challenged with heat stress regardless of the type of hutch.

Placing shadecloth over hutches is effective at reducing temperatures just as it does with adult cows. Making sure calves have plenty of fresh water also helps them cope with heat and orienting hutches to the north in summer to maximize shade can also help. What else?

Many dairy advisors have recommended placing a concrete block under the hutch to improve airflow but no one had ever tested this method to see if it did what it was supposed to. We evaluated fifteen calf hutches on one dairy over a 48-hour period. We installed temperature and humidity data loggers in each hutch and placed one outside, providing us with hourly measures. Three times a day we evaluated internal and external hutch carbon dioxide levels (a sign of problems with fresh air circulation), measured airflow and observed calf respiratory rates. For the first 24 hours, the plastic hutches stayed snug to the ground. For the next 24 hours, they were elevated with an 8 X 8 X 16 inch concrete block.



Holstein dairy calf in a plastic hutch.



Measuring hutch airflow using an anemometer. Wind speed is zero without hutch elevation.



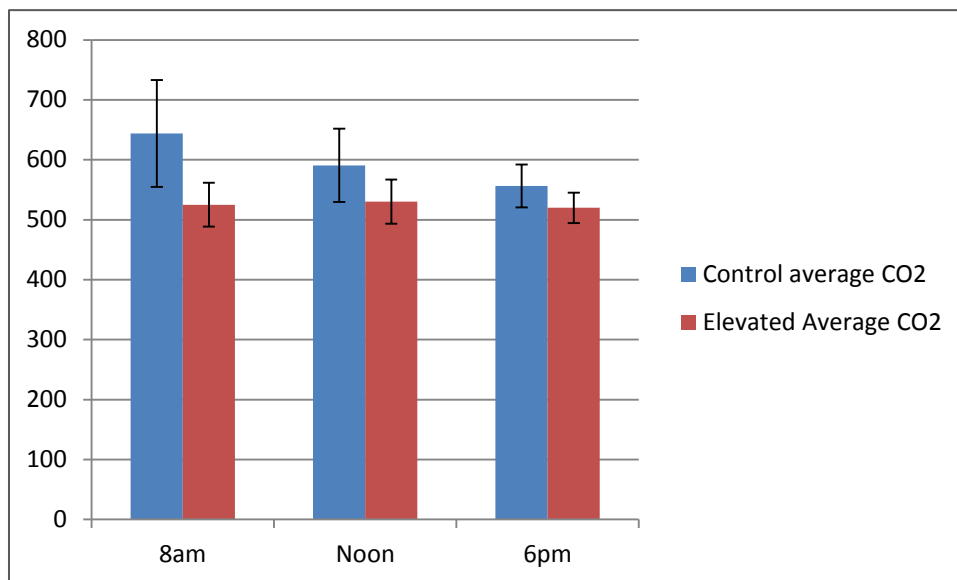
Calf utilizing hutch shade.



Hutches elevated with a concrete block.

### What did we see?

- Calf respiratory rate was higher with higher internal hutch temperature. For every 1°C increase in internal hutch temperature, respiratory rate increased by 2 breaths per minute.
- At the hottest times of the day, internal hutch temperatures were *higher* than outside temperatures when the hutch was on the ground. Internal hutch temperatures were *lower* than outside when the hutch was elevated.
- Elevating the hutch improved air movement within the hutch.
- Hutch elevation lowered afternoon respiratory rates in the calves (58 vs. 44 breaths per minute;  $P < 0.05$ ).
- Carbon dioxide levels were lower when the hutch was elevated.



Calf respiratory rate can indicate a level of heat stress. In the late afternoon, elevating the hutch lowered the temperature and subsequently, the respiratory rates of the calves. Decreasing carbon dioxide levels within the hutches is important because the concentration of this gas is associated with poor ventilation. The evidence for internal air movement is also an indication of better ventilation from elevating the hutch. Improving ventilation and reducing heat are both important to calf health and welfare. Dairy producers now have another validated choice to remediate summer heat stress in calves.

## References

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For more information on calf housing, see the WSU Veterinary Medicine Extension Website with calf housing factsheets and on-line programs at:

<http://extension.wsu.edu/vetextension/calfscience/Pages/CalfHousingEnvironment.aspx>

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