SETTER ROOM | HATCHER ROOM

Sense-check your CO_2 sensor calibration

CO_2 sensors are used by most manufacturers to adjust the ventilation rates of setters and hatchers.

The control systems in those machines will monitor CO_2 level and use the recorded value to reach decisions about ventilation rates. This is a good way of creating dynamic ventilation profiles for flocks with different fertility and egg sizes.

High fertility batches will produce more CO_2 and will be ventilated more when running on CO_2 sensors, whereas running on a fixed program could normally meet only average needs.

However, the level of O_2 in a machine will be highly correlated with the level of CO_2. This means that any calibration inaccuracy of a CO_2 sensor can create serious problems. A drift in the CO_2 sensor will mislead the ventilation program and create problems, depending on the drifting value. It is very common to see hatchability, chick quality and chick yield issues related to misaligned CO_2 sensors.

Therefore, we have to be sure that the calibration of the CO_2 sensors is accurate. Fortunately, in addition to routine calibration, there is a fast and easy way to check CO_2 sensors when a machine is empty.

Outside air contains 300-400ppm (0.03-0.04%) of CO_2. Inside, if the hatchery ventilation is working well, corridors (or air intake plenums) should have 400-600ppm (0.04-0.06%). When we run machines empty with 100% open dampers, we should read CO_2 level similar to that in the corridor.

If the readings are too low or too high, we need to recalibrate the CO_2 sensors with a zero-calibration kit. If calibration is not possible, replace the failing sensors.

The pictures show control panels of two pairs of setters. In both pairs, the machine on the right hand side (with higher CO_2 reading) will ventilate more than the one on the left. The first machine (0.2% CO_2) will have insufficient ventilation, especially at the last stages while the other three will be over ventilated to a lesser or greater extent.

In setters, insufficient ventilation will cause insufficient weight loss and late embryo mortality. Over-ventilation will cause excessive weight loss and cold spots. In hatchers, insufficient ventilation will cause excessive chick yield, navel problems, late mortality and ascites. Over-ventilation will cause cold spots, wide hatch window and dehydration.

0.02% vs 0.16%

0.08% vs 0.17%

Figure 1 *Some examples of CO_2 calibration drift.*