Attention to ventilation is key if housed cattle are to thrive

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Last month, MSD Ireland asked Jamie Robertson, a ventilation expert from the University of Aberdeen, Scotland, to facilitate a discussion with a group of farmers and advisors on a farm visit in Co Westmeath. Jamie started by challenging farmers to identify the amount of money on their farms associated with animal deaths, lack of thrive, medicines and vet fees and then consider how much of this would have been better spent on building improvements to offset some of the problems. Jamie is passionate about having proper ventilation in a building to maximise animal health and liveweight gain. He stated that problems in farm buildings are usually due to an imbalance in one or more of three separate factors – moisture, fresh air and air speed. See Table 1.

He went on to explain to farmers that when animals are grouped in a shed, they produce heat. This heat rises and when it hits the roof, it can either be released through an outlet in the roof or, if no outlet is available, it will cool down and come back down over the animals again.

The air flowing back on to the animals will almost certainly carry harmful bugs and has been proven to cause ill-health and respiratory problems. As the heat from the animals rises, it is replaced by 100% fresh air. This is known as the “stack effect”. Jamie made the point that most farmers should check how well their sheds are ventilated when cattle are in them, on a calm day, with no wind outside.

Jamie pointed out that the shed has to work in all types of weather as animals will always expel heat and this warm, bug-filled air has to get away through an outlet to be replaced by fresh air. He made a very interesting point in relation to the stack effect and young calves. He said that “calves cannot produce enough energy/heat to drive the stack effect.” In every calf-rearing house, mechanical fans are needed to extract the air to the outlet.

Jamie explained that it is tempting to dismiss a building as “overstocked” and that this is the main contributor to animal health problems on farms.

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your farm assets

“Your farm assets will only thrive. He said every farmer should have a healthy environment for livestock to thrive. Jamie explained that having correct air inlets and outlets on farm buildings is paramount in providing a healthy environment for livestock to thrive. He said every farmer should carry out the following simple assessment of his farm buildings.

• Assess the roof first. No outlets means a guaranteed contribution to problems.

  • Area of opening (outlet) in roof:
    – Ballpark outlet areas at the ridge: 0.04m² per calf and 0.1m² per adult. Seldom less than 200mm wide open ridge for adult and growing cattle.
    – Depends primarily on slope of roof. A flat roof is bad: a slope of at least 17 degrees is good.
    – Area of inlet: at least twice or, preferably, four times the area of outlet.

  • Design of inlet:
    – Always look to eliminate draughts at animal height.
    – Large openings do not control air speed, they increase them. Large openings that may create stress at animal level should be replaced with space boarding, Yorkshire boarding or even mesh-type products (wind break) to control air speed.
    – Inlet and outlet areas are best as a series of diffuse openings along the ridge and walls; less risk of stagnant areas within the building.

Jamie clearly made an impact with his straight-talking and visible passion for animal health to the many farmers present, with one farmer saying: “I have to go home now and let off some hot air.”

Continued on next page
Michael (Mickey) Nicholls farms a suckler to weanling enterprise near Mohill, Co Leitrim. Pneumonia in weanlings after housing in October and in young spring-born calves prior to turnout has been a major ongoing problem on the farm. Respiratory disease of cattle leads to increased veterinary costs and reduced animal performance.

Mickey identified that the slatted house was the main contributing factor to the disease outbreaks and decided to take steps to alleviate the problem. The existing slatted shed originally consisted of a five-bay single shed, which was converted in 1988 to a five-bay double shed with a central passage and cubicles at the back of the slatted area on eight of the 10 bays. The main deficiencies identified in the shed were:

- Eave height of 2.3m with a 10-degree slope in the roof.
- Inadequate inlet with walls built to top of stanchion.
- Inadequate airspace per animal housed.
- Inadequate outlet.
- Evidence of poor airflow, stuffy smell, cobwebs, dust and dirt on the roof and end sheeting.

All roof sheeting was removed, numbered and reused on the building. The eave height and ridge heights increased by 1m and 1.7m, respectively, resulting in the roof pitch changing from a 10-degree to a 15-degree slope.

The inlet now consists of 1.3m of Yorkshire boarding. Boards are 100mm in width with 75mm openings and 50mm between the outer and inner boarding. This resulted in an increase in inlet area from 9m² in the original shed to 25m² after conversion.

The outlet ridge in the roof has also been widened from 250mm in the original shed to 600mm, changing the outlet area from 5.6m² to 13.5m².

The overall shed conversion increased airspace by 160% from 1,036m² to 1,658m².

Mickey is confident that the changes in shed design will improve air movement within the shed, resulting in the removal of airborne pathogens and a significant reduction in future respiratory disease outbreaks.

**Case study**

**Table 3: Original shed v converted shed**

<table>
<thead>
<tr>
<th></th>
<th>Original shed</th>
<th>Converted shed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eave height</td>
<td>2.3m</td>
<td>3.3m</td>
</tr>
<tr>
<td>Ridge height</td>
<td>4m</td>
<td>5.7m</td>
</tr>
<tr>
<td>Roof slope</td>
<td>10 degrees</td>
<td>15 degrees</td>
</tr>
<tr>
<td>Inlet area</td>
<td>9m²</td>
<td>25m²</td>
</tr>
<tr>
<td>Outlet area</td>
<td>5.6m²</td>
<td>13.5m²</td>
</tr>
<tr>
<td>Airspace</td>
<td>1,036m²</td>
<td>1,658m²</td>
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</tbody>
</table>

Tom Coll and Mickey Nicholls.