



Asda Calf Housing

Rapid-assembly mono-pitch

Background

The aim of this feasibility study was to evaluate different temporary housing types that could be deployed to provide accommodation in situations where additional housing is needed in short order; for example should it be put under movement restrictions for statutory disease control.

Experience from the field and observational epidemiological studies has demonstrated that significantly increasing stocking density in existing buildings increases the probability of disease transmission, reduced growth rates and a deterioration of calf welfare.

The first of these trials utilised group calf hutches, while the second looked at performance within a calf-specific polytunnel. This study focused on the construction of calf accommodation using insulated boarding to create group mono-pitch pens.

Environmental loggers capable of measuring temperature and humidity were installed in:

- The existing accommodation – in the calving pen, the lean-to shed and individual pens.
- The new accommodation – at the north, south and middle aspects of the buildings.
- Outside – near the existing accommodation and by the new accommodation.

Weights rates were monitored for stock in both sets of accommodation, and growth rates calculated. Due to the low number of calves born at the unit, and practical constraints on fill order / deviation from protocol, direct statistical comparisons cannot be made. Growth rate figures are included for indicative purposes only.

Temperature

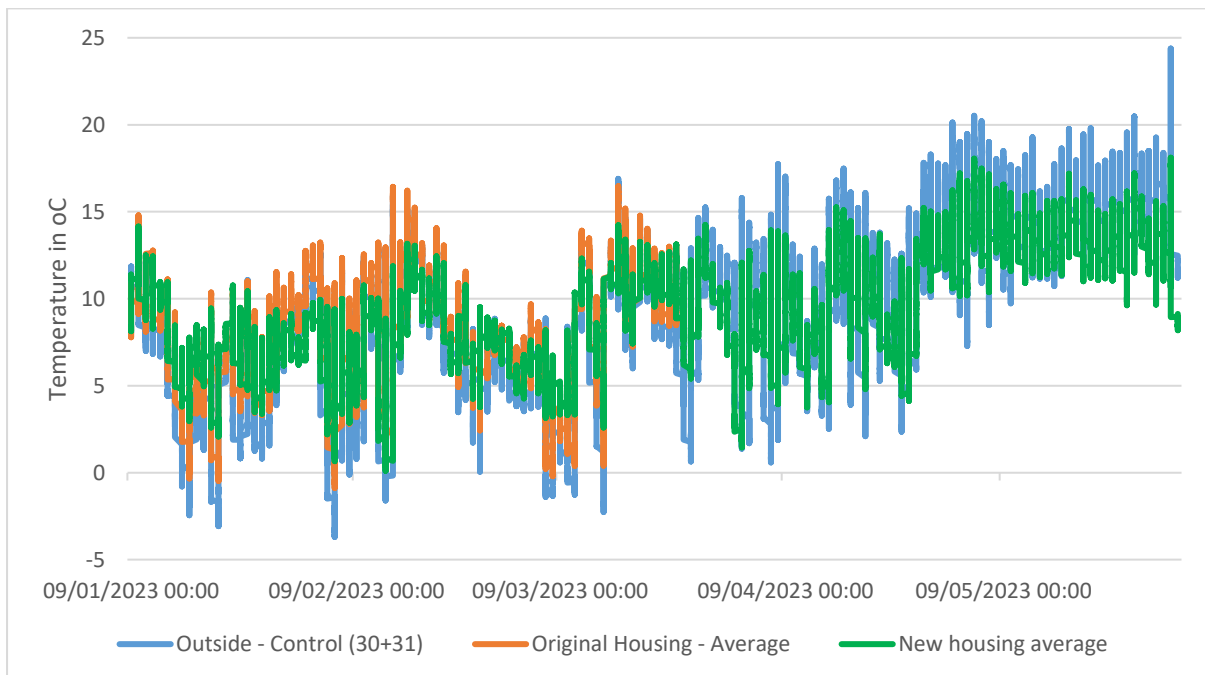


Figure 1. Temperature for different housing types (and outside control) by 15 minute intervals.

Temperature data was evaluated between 9th Jan to 2nd Jun 2023, although the ‘original housing’ monitors batteries depleted around 23rd March. In descriptive terms, the late spring of 2023 meant that the extremes of temperature seen across the first half of the year were not as extreme as other years. The new housing temperature appears to have been generally lower than that found in the original housing, and higher than outside ambient temperatures. From this data there is some indication that the variance in temperature – often cited as increasing risk of disease in calves – was less.

Focusing on the daily temperature variance – here defined as the difference between the maximum and minimum temperatures per location per day, with sensor readings averaged across each housing type logger – there is evidence that variance in the new housing was lower than both outside and potentially the original housing. While there is still more scientific work to be done in relating temperature variance with calf health and performance, a variance of more than 10°C per day is regarded as likely to be significant by most calf housing experts. The new housing only had two days where a 10°C was exceeded, much less than the other two locations.

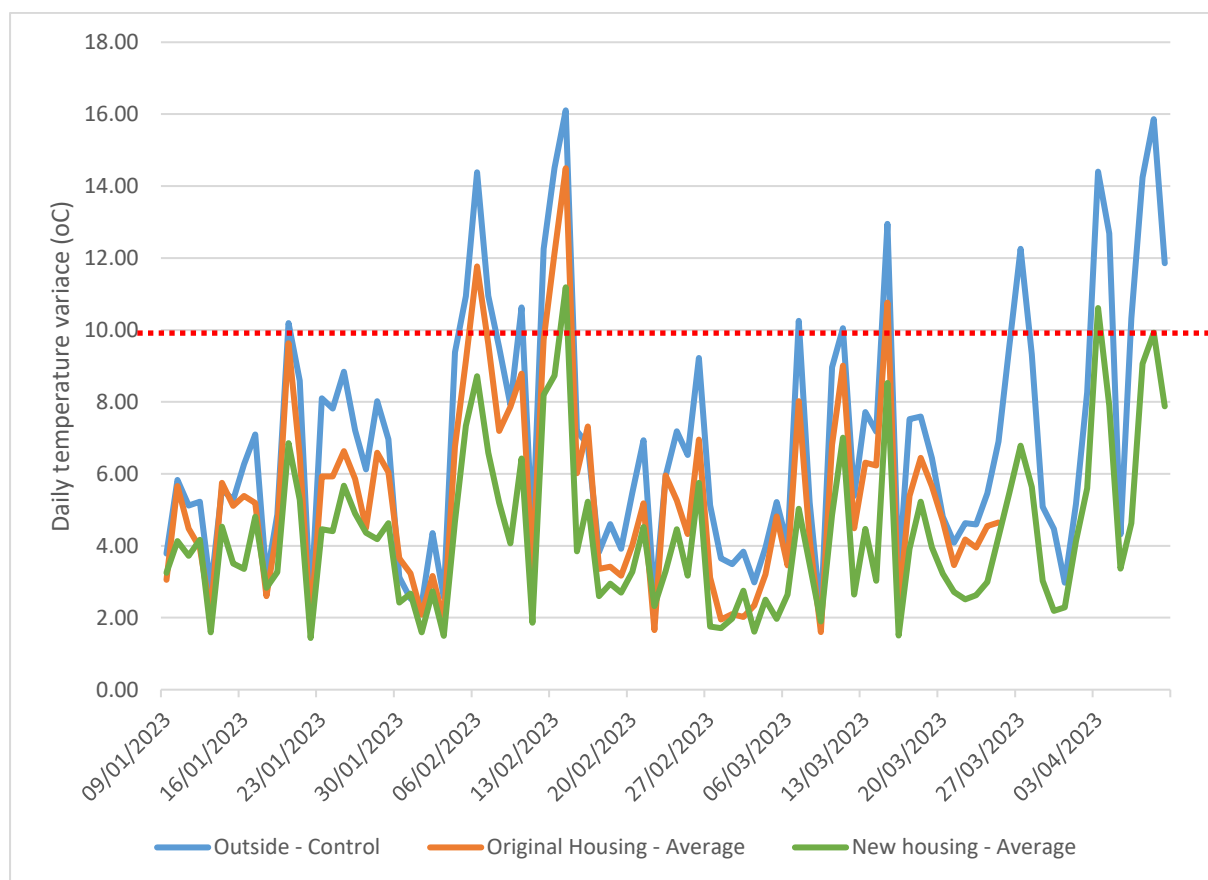


Figure 2. Daily temperature variance (max-min) in different housing types and outside.

Another way of looking at the variance is to compare it to the control (outside temperatures). In Figure 3, the reduction in variance compared to outside is given (negative values indicate less variance and are ‘better’). The new housing showed less variance when compared to the outside temperatures (i.e. resisted ambient daily variation more) compared to the original housing.

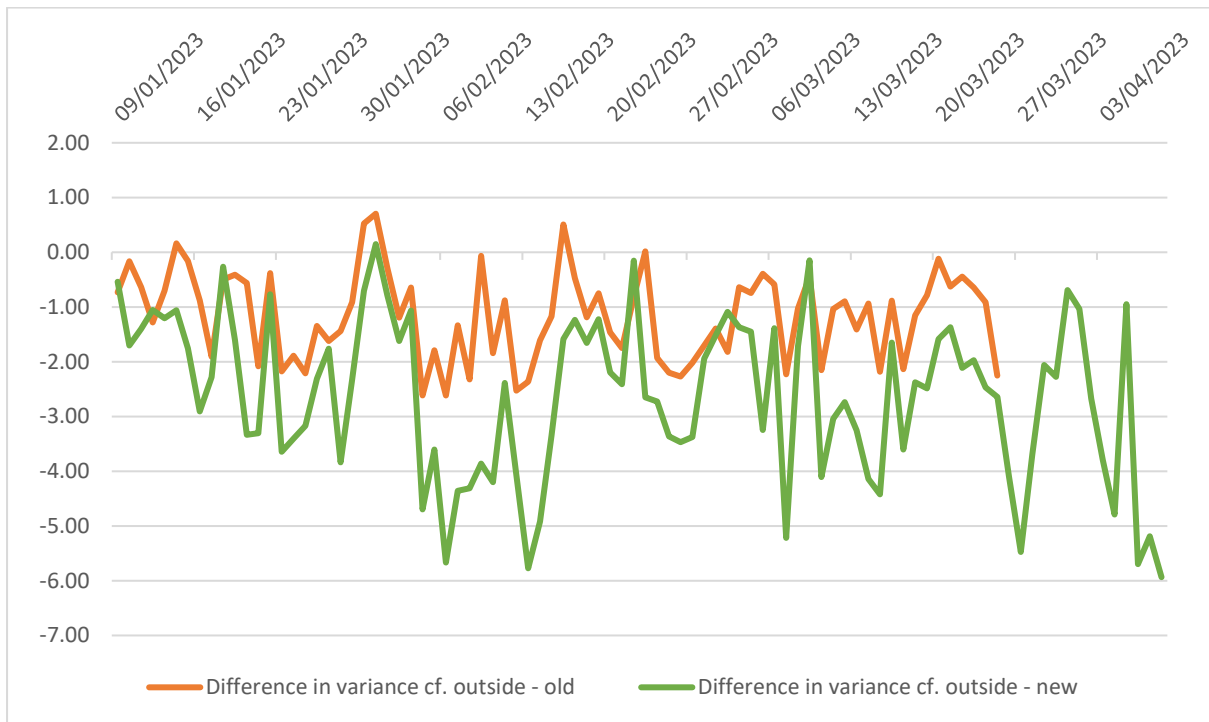


Figure 3. Difference in variance from outside (lower numbers better)

Another way of looking at temperature variance is by looking at average fluctuations across a 24 hour period. Clearly these sort of averages hide a lot of detail, as they incorporate a large number of days/months' data. However, they are nonetheless informative: the night-time temperatures appear to have been approximately equivalent between new and original housing, and significantly higher than outside temperatures. Daytime temperatures in the new housing showed less of an increase than both the outside and original housing.

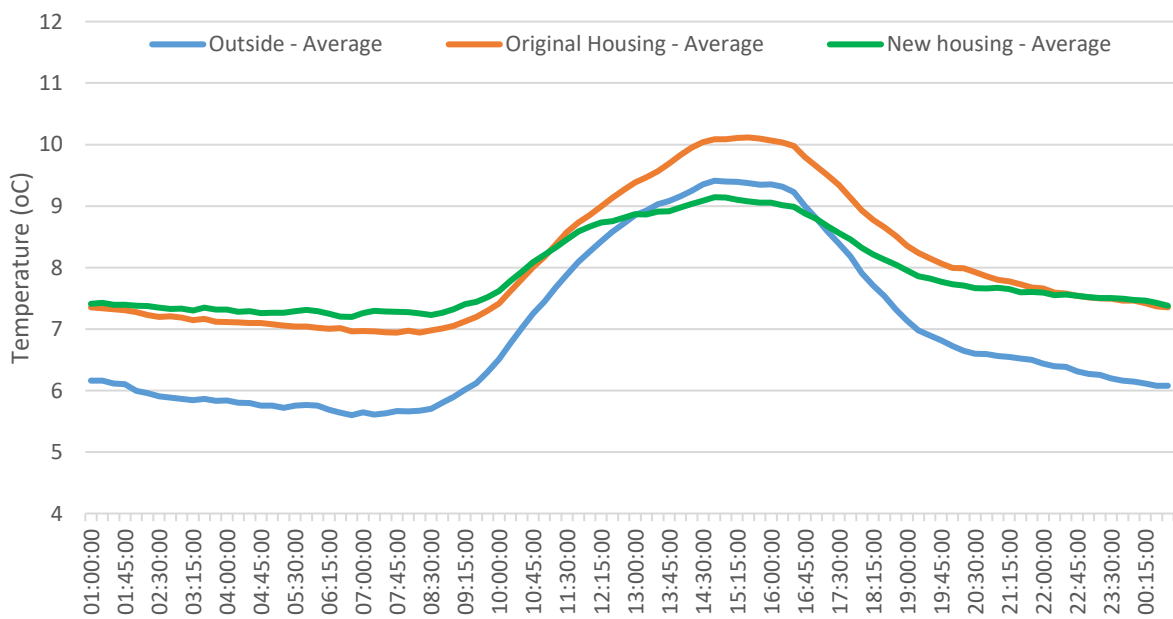


Figure 4. Daily average temperatures Jan-Jun in different housing types and outside.

The humidity in each of the housing types is difficult to explain, in that the humidity outside was generally higher than within the two types of housing. It seems likely that these are false readings due to either increased condensation around outside sensors, or a desiccant effect of dust from bedding. It is therefore inadvisable to try to draw any conclusions from the data.

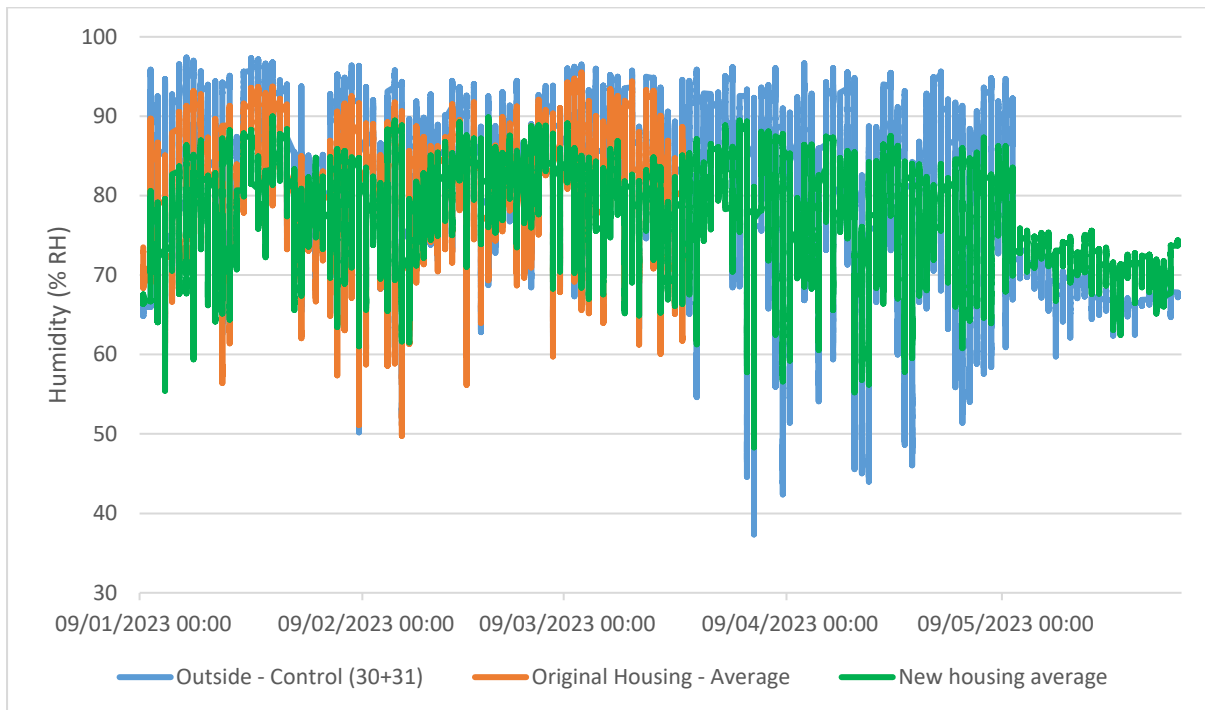


Figure 5. Humidity by 15 minute intervals across the trial period

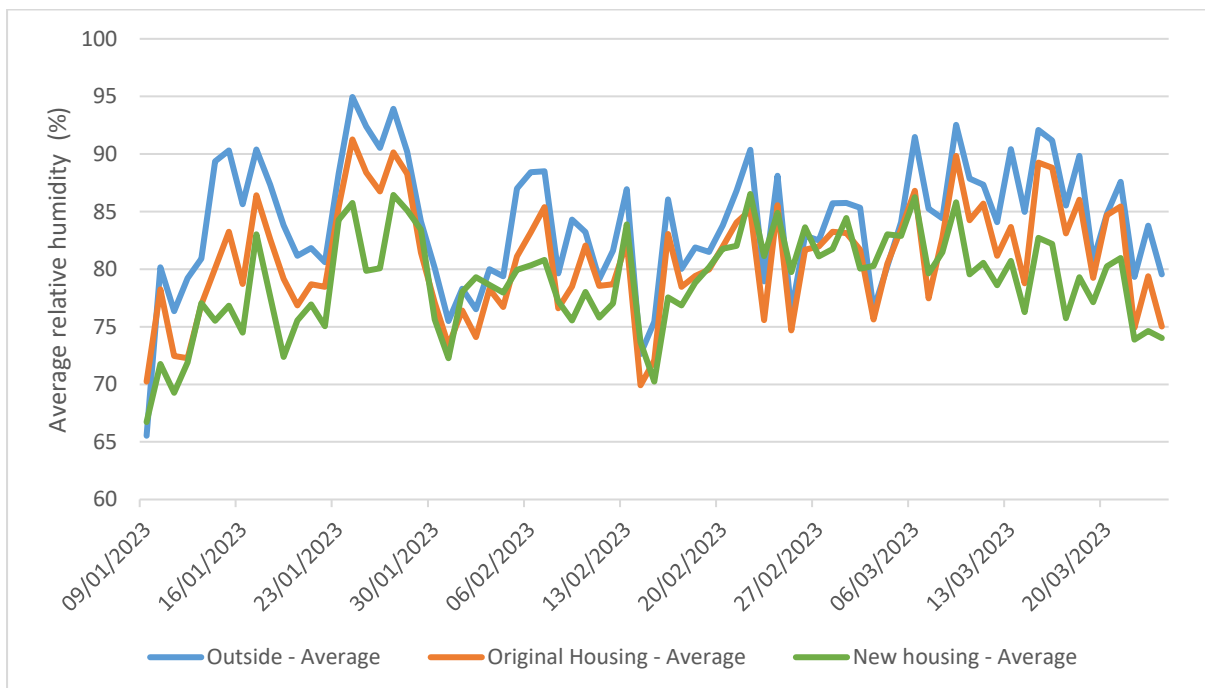


Figure 6. Humidity daily average across the trial period

Calf Performance Data

While the aim of the original project was to examine growth rates of calves in both accommodation types for direct comparison, the data provided was limited to a small number of animals born from June 2022 to around November 2023. Month of birth has previously been shown to influence daily liveweight gain (DLWG), and so limits the scope of any statistical analysis. In addition, weight data for later animals was incomplete, and birthrates were not measured, further limiting the value.

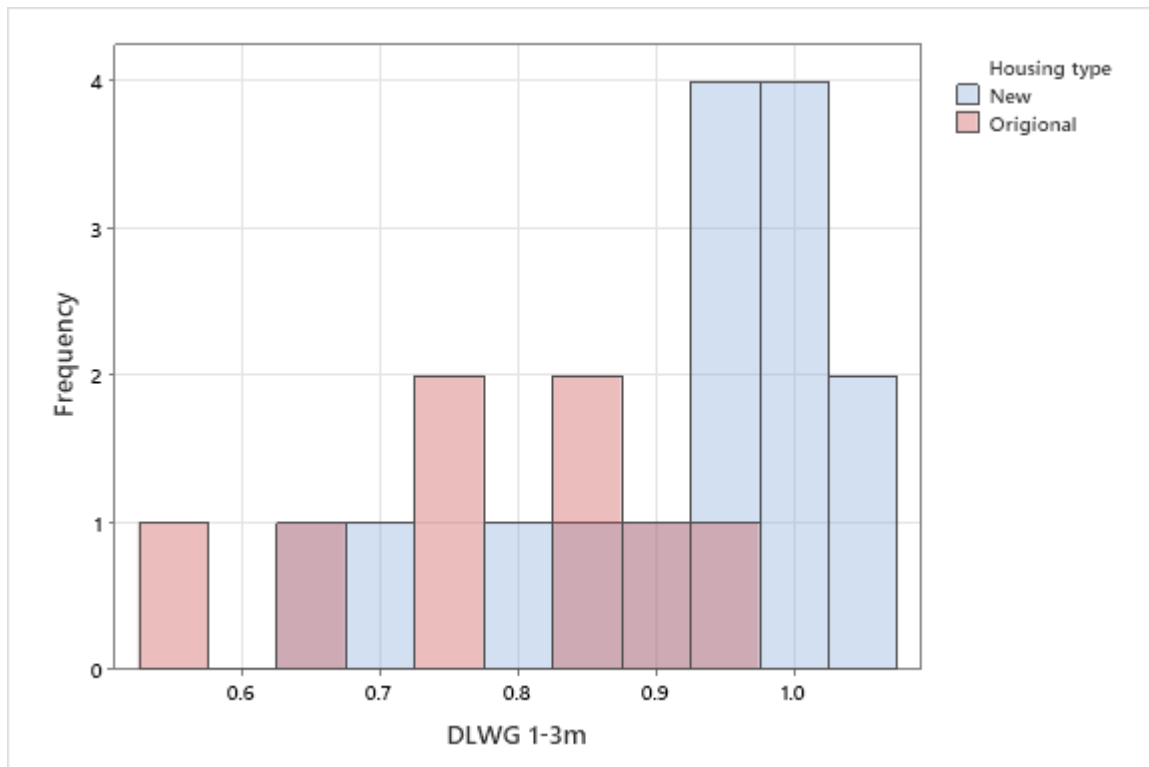


Figure 7. Daily liveweight gain in animals in the different housing types between 1-3 months of age

What was apparent from the data was that average daily liveweight gain between 1 – 3 months of age appeared numerically better in those housed in the new accommodation compared to the old. However, only a small amount of old accommodation (n=8) and new accommodation (n=15) calves had suitable weight data, and it is not clear whether other factors changed over the trial time period (e.g. hard feeds or milk; disease outbreaks etc.).

Growth rates in old housing calves averaged 0.78kg/day between 1-3 months, while new housing calves averaged 1.03kg/day. Statistical comparison is inappropriate for the reasons outlined above, but it could be said that the new-housing did not disadvantage calves, and may have facilitated better performance.

Conclusions

- The new accommodation reduced temperature variation across the season compared to conventional housing or ambient outside temperature.
- Calves performed well in the new accommodation, and were certainly not disadvantaged, but poor data quality and deviation from protocol preclude statistical analysis.
- The trial indicates that this type of rapid-build housing may be invaluable for units requiring extra accommodation to prevent over-stocking.

Appendix A. The 'new' housing deployed on farm

