

Excellent Performance on Outwintering Pads

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Relative to traditional slatted floor accommodation, outwintering pads (OWP's) have a positive impact on animal growth rate, health, welfare and reproductive performance. However the system can produce large volumes of effluent with a high pollution potential, which must be properly managed to achieve environmental sustainability.

It is expected that OWP's will require planning permission, with construction of the system completed according to a standard specification.

Fattening Cattle

During the winter of 2000/2001 the first experiment was carried out to evaluate the OWP's, as a full time accommodation system for finishing continental x Friesian steers. The OWP's were constructed from a bed of woodchips over a lined and artificially drained surface.

One hundred and twenty six cattle were assigned to one of seven treatment groups: one group was kept indoors on a slatted floor at 3.0m² space allowance per animal. The other six groups were accommodated outdoors on OWP's and allowed a space allowance of 6.0, 12.0 or 18.0 m²/head. Shelter was provided for three of the outdoor groups using a 2.0m high netlon windbreaker. The other three groups had no shelter on what is an exposed site, during a winter that was both wetter and colder than normal.

All animals were offered silage *ad-libitum* and were supplemented with 5.0kg concentrates per head daily. The experiment extended from November 4 to April 4, after which all animals were slaughtered and carcase data obtained.

Animal welfare

Extensive measures of prevailing climatic conditions and animal behaviour, immune function, cleanliness, hair length and hoof condition were conducted to determine if outwintering compromised the well being of animals. When indoor and outdoor environments were compared over the experimental period, the ambient air temperature was lower outside (3.5 versus 5.0 °C), while relative humidity was higher indoors (90.6 versus 86.0 %). Wind speed was reduced by the provision of shelter.

- The climatic energy demand (CED) refers to the amount of heat energy required to sustain normal body temperature. There was no measurable effect of shelter on the CED of animals outwintered. The CED for animals outdoors was higher than for animals accommodated indoors on slats (70.3, 71.1 or 59.2 W/m² for animals sheltered, exposed or indoors, respectively).
- There was no effect of shelter on mean hair length - housed animals had a shorter mean hair length than those accommodated outdoors (1.11 versus 1.36 cm). There was no effect of outdoor shelter at any space allowance on animal cleanliness. Each incremental decrease in space allowance on OWP's increased the recorded mean dirt score over the experimental period (3.9, 3.3, and 2.7 for 6.0, 12.0 and 18.0 m²/head outdoors, respectively and 2.8 for animals indoors).
- There was no effect of space allowance, shelter or housing on time spent lying and eating, blood cell profiles or on the measured index of immune function.
- There was no significant effect of shelter, space allowance or housing on the development of interdigital dermatitis or cracks on either hoof.
- Animal behaviour studies showed no effect of accommodation environment on aggression. There was a tendency to have a lower number of lying bouts indoors, which has previously been associated with animal discomfort or unease with underfoot conditions. The under-foot conditions provided by OWP's allowed the animals more security during the standing/lying actions.

Animal Performance

The animal performance results are shown in Table 1. Among the animals on the OWP there was no significant effect of stocking density or provision of shelter on growth rate, carcass traits or feed efficiency. The cattle accommodated on the OWP's had higher liveweight and carcass gains than those in slatted floor sheds. The cattle on the OWP's had better feed conversion efficiency and lower fat scores than those in slatted floor sheds.

During the winter of 2001/2002 selected treatments from the above experiment were repeated in a second experiment. This relative advantage in animal growth rate and feed efficiency of the cattle on the OWP was confirmed.

Managing the OWP.

The OWP surfaces were inspected daily to quantify surface cleanliness, and were scored for the proportion of clean and dirty areas. If there was less than 2.2 m² of dry clean lying area available per animal, then the OWP was cleaned off. During cleaning, the top 10 cm approximately of wood chips were removed with a fork loader and the OWP was replenished with clean chips. During the experimental period of 2000/2001 the space allowance treatments of 6.0, 12.0 and 18.0 m²/head required cleaning on 10, 2 and 1 occasion(s), respectively.

Autumn Calving Sucklers

During the winter of 2001/2002, the Grange autumn calving herd, composed of Charolais X Limousin cows with Belgian Blue crossed calves were assigned to one of two housing systems. Half of the cows were accommodated indoors in a slatted floor shed with the calves having access to a straw-bedded creep area. The other half of the cows were accommodated outdoors on the OWP at a stocking rate of 22 m²/cow and calf, with the calves having access to a sheltered creep area. The cows were fed silage *ad-libitum* and 2.0kg concentrate and the calves were offered creep concentrates *ad-libitum*.

The reproductive performance, feed intake and growth rates of the cows and calves are shown in Table 2. The cows and calves on the OWP's had marginally higher feed intake and similar liveweight gain, to their counterparts in the slatted floor sheds. However, after turnout to grass both the calves and cows that were outwintered had higher growth rates than their housed counterparts. The cows on the OWP had a shorter calving to conception interval and a higher proportion were returned in-calf than the indoor cows. This difference was mainly due to low submission rates indoors because of significantly reduced reproductive activity.

Conclusion

The initial animal production and welfare results from the OWP research programme are very positive, however the programme is on going and there is further work to be done. A major parallel and uncompleted part of the project is evaluating construction, effluent treatment and environmental issues. These are of critical importance to the sustainability and viability of the OWP system. When this information has been gathered and analysed it will also be published.

Table 1 : Animal performance, carcass characteristics and feed efficiency of finishing steers on OWP's at different stocking densities, with or without shelter relative to indoors in a traditional slatted floor shed

| Conditions | <u>Exposed</u> | | | <u>Sheltered</u> | | | <u>Indoors</u> |
|-----------------------------------|----------------|------|------|------------------|------|------|----------------|
| | 6 | 12 | 18 | 6 | 12 | 18 | 3 |
| Space allowance (m ²) | | | | | | | |
| Feed intake (kgDM/day) | 9.9 | 10.0 | 10.2 | 9.9 | 10.1 | 10.1 | 9.6 |
| Liveweight gain (g/day) | 1165 | 1174 | 1216 | 1174 | 1136 | 1229 | 991 |
| Carcass gain (g/day) | 695 | 700 | 710 | 656 | 657 | 734 | 616 |
| Feed efficiency [†] | 57.7 | 57.7 | 57.3 | 54.3 | 53.3 | 60.7 | 51.3 |
| Fat score/100 kg carcass | 1.09 | 1.06 | 1.10 | 1.07 | 1.10 | 1.07 | 1.18 |
| KKCF/carcass (g/kg) | 35.3 | 32.9 | 36.7 | 32.4 | 34.7 | 34.0 | 39.7 |
| Conformation | 2.89 | 2.89 | 2.72 | 2.71 | 2.89 | 2.89 | 2.67 |

[†]g carcass gain/kg feed DM consumed

Table 2: Performance of autumn calving suckler cows and their calves on OWP's relative to housing on a slatted floor and subsequent performance after turn-out to grass.

| | <u>Outwintered</u> | <u>Housed</u> |
|--|--------------------|---------------|
| Cow total DM intake (kgDM/day) | 12.1 | 11.7 |
| Calf winter creep intake (kg) | 92 | 87 |
| Calf liveweight gain (g/day) | 1064 | 1081 |
| Calving to conception interval (days) | 86 | 122 |
| Proportion in-calf | 0.92 | 0.69 |
| Calf liveweight gain at grass (g/day) | 1020 | 1164 |
| Calf weaning weight (g) | 317 | 303 |
| Cow liveweight gain calving to weaning (g/day) | 300 | 260 |

Photo caption

During the last two years, outwintering pads (OWP's) have been evaluated as a beef cattle accommodation system at Grange Research Centre