

Evaluation of Animal Health in Beef Production in Relation to Housing and Feeding Systems: "The Götala Husbandry Project"

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In Sweden specialized beef production is based on groups of bull calves collected from dairy herds. The calves are usually reared in a welcoming unit for two months and thereafter in a fattening unit. The most common type of building for this production is an insulated building with slatted floor in the pens. Problems with pneumonia occur regularly either during the period in the welcoming unit or during the first month in the fattening unit. The environment in the conventional fattening unit may contribute to the problems with respiratory diseases. Furthermore the insulated building is relatively expensive. In order to evaluate the influence of the housing system on animal health and production a three year study was conducted. A conventional building and an uninsulated building were used for the fattening period. Two different feeding regimes were also compared and in the uninsulated building two stocking densities in the pens were studied.

The study was performed as a joint project with the Swedish University of Agricultural Sciences; the department of Animal Nutrition and Management and its Western District of Animal Research, the Department of Animal Hygiene and the Animal Health Service. This part of the study covers the results concerning animal health.

Materials and Methods

Animals:

10 groups of 60 or 90 male calves of the Swedish Red and White Breed, were purchased during a three year period. After a period of 10 weeks in a welcoming barn the calves were divided into two groups for fattening. Each group was then introduced into its designated building where the animals were reared until slaughter.

Buildings:

An insulated house with boxes with slatted floor was used together with an uninsulated house with strawbedding in a lying area and a concrete passage in front of the feed bunk. The ventilation was controlled in the insulated

building and the air volume was 9 cubic metres per animal. The uninsulated building was ventilated through an open ridge and the air volume was about 40 cubic metres per animal.

In the uninsulated building there were either 11 or 15 animals per pen while there were 11 animals per pen in the insulated building.

Feeding and production system:

Seven of the ten groups were fed concentrates *ad lib* and a restricted amount (0.5 kg/animal) of hay daily. The hay was substituted with straw after one month. The groups were sent to slaughter either at a live weight of 220 kg (bull calves) or 430 kg (bulls), the rearing period in the fattening unit being 90 and 240 days respectively. Three groups were fed silage *ad lib* (silage bulls) and 1 kg concentrates per 100 kg live weight daily. They were sent to slaughter at a live weight of 460 kg after a rearing period in the fattening unit of 320 days.

The design of the study was that the first group was reared as bulls, the second as silage bulls followed by a group of bull calves and so on. The number of animals and groups are given in the table below.

Category	No. of Batches	No. of Animals	Age at Slaughter
Bull Calves	3	254	7 months
Bulls	4	316	12 months
Silage Bulls	3	165	15 months

Animal Health:

All treatments in the two housing systems were individually recorded. On animals sent to sanitary slaughter or animals found dead, autopsies were performed. At slaughter all animals were examined for pathological lesions in the lungs, heart and liver. Pneumonic lesions and liver abscesses were recorded according to severity of the reactions. A 3-graded scale was used (mild, moderate and severe macroscopic reaction). The rumens of bulls and silage

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bulls were examined for lesions in the mucous membrane such as parakeratosis and rose bud formations.

Results

Comparing animal health in the two housing systems, the preliminary results indicate that there was no difference in the incidence of pneumonia. In the insulated building 2.4% of all animals were treated as compared to 3.5% in the uninsulated building. The only difference in disease incidence observed between the housing systems was that 15.7% of all animals in the uninsulated building had to be treated against interdigital phlegmon in contrast to 6.1% of the animals on slatted floor. The incidence of clinical pneumonia was 3.6% in the groups fed concentrates *ad lib* (bull calves and bulls together) versus 0.5% in the silage fed bulls. Differences between the feeding regimes were also observed concerning interdigital phlegmon. In the groups fed concentrates *ad lib*, 9.1% of the calves and 18.7% of the bulls had to be treated in contrast to 2.2% of the silage-fed bulls.

Looking at the lesions observed at slaughter, no differences were recorded comparing the housing systems. The different feeding regimes and ages at slaughter gave the following results concerning pneumonic lesions:

Pneumonia Lesions %

Category	Grade 1	Grade 2	Grade 3
Bull Calves	25.8	17.5	8.3
Bulls	21.5	9.8	3.8
Silage Bulls	16.7	5.4	0.5

Different stages of liver abscesses were observed in the groups fed concentrates *ad lib*. Multiple liver abscesses were recorded in 17.0% of the bull calves and 25.9% of the bulls. In the groups of silagefed bulls, only one case with a single liver abscess was seen. Feeding bulls with concentrates *ad lib* also resulted in frequently observed pathological reactions in the rumen. Rosebud formations and

parakeratosis was seen in 50.3% and 27.4% of the bulls. Among the silagefed bulls these reactions were rarely observed (1.2 and 1.8%).

Discussion

Disease incidence during the fattening period was not influenced by the housing system with the exception of a higher incidence of interdigital phlegmon in animals kept in pens with strawbedding and concrete floor. This may partly be explained by the fact that the concrete floor was only cleaned three times a week. As expected the feeding of concentrates *ad lib* resulted in a high incidence of liver abscesses and reactions in the rumen mucosa. However, the concentrates *ad lib* fed animals also had higher incidences of clinical diseases as well as pneumonic lesions at slaughter as compared to the incidences found in the silage fed bulls. The underlying reasons for these results need further investigations.

Summary

The effect of two different housing systems and two different feeding regimes on animal health was evaluated during a three year period. An insulated building with boxes with slatted floor was compared with an uninsulated building with boxes with strawbedding. Two different feeding regimes were used in both barns: concentrates *ad lib* and 0.5 kg roughage/calf and day or grass-silage *ad lib* and 1 kg concentrate/100 kg live weight daily. There was no significant difference in disease incidence in the two housing systems except a higher incidence of interdigital phlegmon in bulls from the uninsulated building with strawbedding. The number of treatments against pneumonia and interdigital phlegmon was lower in the groups of bulls fed silage *ad lib*. Pneumonic lesions, liver abscesses and reactions in the rumen were more frequent in the groups fed concentrates *ad lib* in contrast to the silage-fed bulls. The present investigation thus indicates an increased susceptibility to infections of the bulls fed concentrates *ad lib*.