

Wolfgang Bea, Eberhard Hartung and Thomas Jungbluth, Hohenheim, with Josef Troxler, Wien

Play- and explorational behaviour of fattening pigs

Influence of different housing systems

Two housing systems for fattening pigs in independent compartments of an experimental stall were compared with regard to animal welfare. The first one was designed as a conventional stall system, while the second one was conceived as an alternative housing system. For the evaluation of play- and explorational behaviour in both systems, the animals were observed in three periods each during four fattening periods. Data regarding the frequency and duration of play behaviour and social partner exploration are presented.

Dipl.-Ing. sc. agr. Wolfgang Bea is an academic fellow, and Dr. Eberhard Hartung is a senior assistant in the Department of Process Engineering in Animal Production and Farm Building Research (director: Prof. Dr. T. Jungbluth) at the Institute of Agricultural Engineering, Hohenheim University, Garbenstraße 9, 70599 Stuttgart, e-mail: wolfibea@uni-hohenheim.de

Prof. Dr. med. vet. Josef Troxler is the director of the Institute of Animal Husbandry and Animal Protection of the University of Veterinary Medicine in Vienna, Veterinärplatz 1, A-1210 Wien.

Summarized contribution to LANDTECHNIK. You will find the long version under LANDTECHNIK-NET.com

Keywords

Animal welfare, playing and exploring behaviour, fattening pigs, alternative keeping systems

For a considerable period of time, the demands on the housing of farm animals in Germany have been subject to a far-reaching alteration process, especially in the areas of environmental and animal protection. Consumers' wishes that farm animals be kept in an animal-friendly way are steadily increasing. This development is accompanied by the alteration and tightening of legal requirements at the European, federal, and state level, or such changes are in preparation. For this reason, the farm animals' demands on housing systems in addition to economic parameters and the environmental effects of stall systems are increasingly being taken into account in conversion measures and the construction of new buildings.

Goals

The goal of this research project was the evaluation of an alternative housing system for fattening pigs, which had been developed further as a conversion solution, under the aspect of animal welfare. The alternative kennel housing system with free ventilation was developed based on a conventional system featuring a fully slatted floor and forced ventilation. This alternative system was compared with the latter. For the assessment of animal welfare in both housing systems, aspects of animal behaviour, the integument (the entirety of all skin layers; editor's comment), as well as the health and the performance parameters of the animals were examined. In this article, studies on play- and explorational behaviour are described.

Material and Methods

The different housing systems were compared with regard to play- and explorational behaviour during four consecutive fattening periods from winter 2000 until autumn 2001.

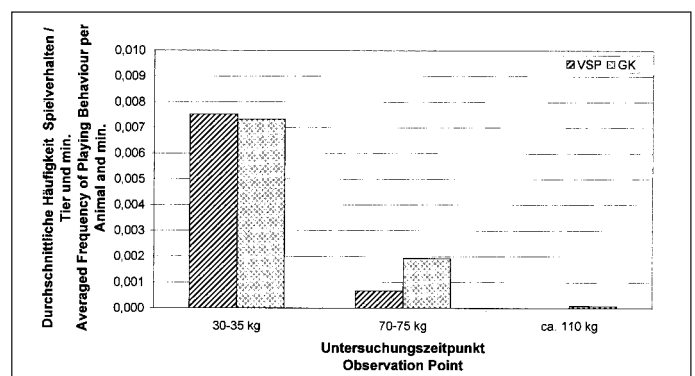
The animals used for the study were a cross-breed of the races German landrace and Piétrain. The origin of the animals was uniform.

For these experiments, the stall was composed of two completely independent compartments having a capacity of approximately 50 animals each. With regard to the constructional conditions, however, both compartments were identical. The compartments were equipped with a liquid feeding system. Feeding during the fattening period was four-phased. The animal : feeding place ratio was 3 : 1. All pens were equipped with nipple drinkers for a maximum of 12 animals per drinker and with an occupational facility for a maximum of 12 animals per automatic system [1, 2]. Both compartments were run parallel according to the in-and-out method.

The conventional housing system (VSP) was characterized by a fully slatted floor, forced ventilation, temperature-insulated walls and ceiling, and warm water heating. The compartment was divided into six pens containing nine animals each (0.8 m²/animal).

The alternative housing system (GK) was equipped with a partially slatted floor, temperature-insulated lying kennels, and free shaft ventilation. The compartment featured two pens for 24 animals each. Each animal

Fig. 1: Average frequencies of playing behaviour per animal and minutes in the compartments VSP and GK at the three points of examination



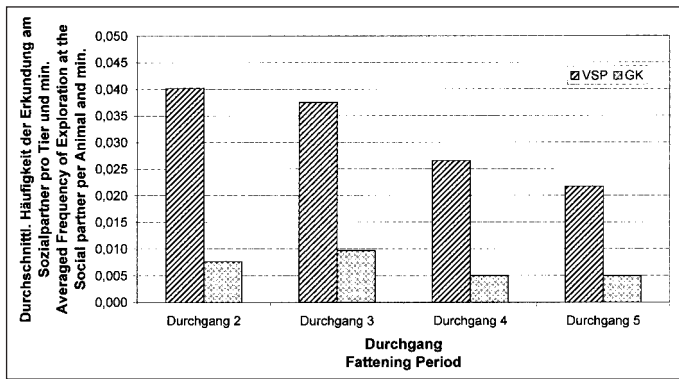


Fig. 2: Average frequency of checking up on the social companion in the VSP and GK compartments

had an area of 1 m² at its disposition, of which approximately 0.4 m² were designed as a resting area. The pens were divided into three functional areas each, which featured different floor coverings [3].

The data regarding play- and explorational behaviour were collected through direct observations. On four consecutive days, four observation sessions lasting 75 minutes each were held in the morning between 7:45 and 10:30 a.m. and in the afternoon between 1:45 and 4:30 p.m. The observations were always carried out by the same person during three periods distributed over the entire fattening period.

The data gained featured non-parametric distribution. The Kruskal-Wallis test was employed for the statistical processing of the data provided by the independent samples. For the evaluation of two dependent samples, the Wilcoxon test was used. The individual animal served as the basis of the evaluations.

Results

The play behaviour observed comprised the behavioural elements „jumping/running/catching“ and „playful fight“. All animals involved were registered. During all fattening periods, the animals in both compartments showed different frequencies of play behaviour. Related to an observation session lasting 75 minutes, each animal played between 0.015 and 0.58 times per session. At a significance level of $p = 0.05$, the differences in the average frequencies of play behaviour between the fattening periods could not be statistically secured. Considered over all four fattening periods, no statistically securable differences in the frequency of play behaviour could be determined between the two housing systems at $p = 0.05$.

Figure 1 shows the average frequencies of play in the three observation periods during the fattening periods.

In both housing systems, the animals showed considerably more frequent play behaviour at a live weight of 30 to 35 kg than at a live weight of 70 to 75 kg. At a live weight of 110 kg, play behaviour only occurred to a very small extent and only in the GK compartment. At a level of $p = 0.05$, the

determined differences between all three observation periods were significant. In addition to the increasingly scarcer floor area, the growing weight of the animals is likely to be the reason why the frequency of play diminished with increasing fattening duration. The increasing scarcity of space affected the animals in the VSP compartment more than the animals in the GK compartment because in principle less absolute space was available per animal. In addition, the relative pen area available was smaller due to the smaller group size in the VSP compartment. This in particular had an effect at a higher live weight of the animals because, due to their growing body volume, the free space which was not occupied by resting animals was not available for playful behavioural patterns.

In addition to play behaviour, the exploration of the social partner by the animals in the pen, which comprised the behavioural patterns „massaging/exploration of the ears, the flank, and the legs“, was registered. For all behavioural patterns, the acting animal was recorded. The exploration of the social partner by the animals was considered under the aspects of average frequency and evaluated with regard to the influence of the four fattening periods, the housing systems, and the three observation periods.

In a comparison of the fattening periods of both housing systems, the evaluation of the data regarding the average frequency of social partner exploration provided different results (fig. 2).

The GK system provided virtually no different results, whose marginal differences could not be statistically secured. In the VSP system, however, different frequencies occurred, which proved significant at $p = 0.05$.

Figure 2 also allows substantial differences in frequency between the housing systems to be discerned. In the VSP compartment, the animals explored their social partners considerably more often than in the GK system. At the level $p = 0.01$, the statistical evaluation showed significant differences between the housing systems VSP and GK. Considered over the duration of an observation session, the animals in the VSP compartment on average explored their social partner 2.4 times, while in the GK compart-

ment the social partner was on average used for exploration only 0.5 times.

In both housing systems, the consideration of the observation periods showed a slightly decreasing tendency in the frequency of social partner exploration over the course of the fattening period. At a level of $p = 0.05$, however, this tendency was not able to be secured.

Conclusions

In both compartments, play behaviour was able to be observed in particular during the first observation period at a live weight of approximately 30 kg. Despite the larger area per animal and despite the fact that a larger total area was available due to the larger animal group, no statistically securable increase in the frequency or duration of play could be determined in the alternative GK housing system as compared with the VSP compartment. On average, the animals in both compartments spent more time exploring their social partners than playing.

The exploration of the social partner is a surrogate activity. Whether or not this can be considered desirable with regard to animal-friendly husbandry is questionable. This behavioural pattern can lead to alterations in the animals' integument [5] and indicates the lack of explorational elements in the housing systems [5]. The evaluation of the data regarding the exploration of the occupational facilities must show to what extent the occupational facilities in the pens influence the described behavioural situation in the two housing systems.

The conversion of the experimental stall was carried out with the support of industry. The study was promoted by the German Association for the Advancement of Scientific Research (DFG) as part of the graduate course „Strategies for the Avoidance of the Emission of Climate-Relevant Gases and Environmentally Toxic Substances from Agriculture and Land Use“.

Literature

- [1] Stubbe, A. und T. Jungbluth: A new Technique for the ethological Improvement of intensive Housing Systems for Pigs. Paper 994106 presented at ASAE Annual International Meeting, Toronto, Ontario/Canada, July, 18-21, 1999
- [2] Stubbe, A.: Entwicklung und Beurteilung einer Beschäftigungstechnik für Mastschweine in intensiven Haltungssystemen. Dissertation, Universität Hohenheim, 2000
- [3] Gallmann, E., W. Bea, E. Hartung und T. Jungbluth: Umbaulösung für Vollspaltenbodenstall. In: Landtechnik 55 (2000), H.3, S. 252-253
- [4] Van Putten, G.: In: Sambraus, H.H. (Hrsg.): Nutztierethologie. Verlag Paul Parey, München, 1978
- [5] Jackisch, T., D. Hesse und M. Schlichting: Strohwühlen statt Schwanzbeissen. DGS – Magazin (1996), H. 40, S. 53 – 56