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Effects of different bedding materials on the behaviour of horses housed in single stalls

The effects of three different bedding materials on the behaviour of horses housed in single stalls were analyzed. The horses were kept on each material for two weeks. Video cameras recorded the behaviour of the horses on the first and last three days of each bedding alternative. Time budgets for the behaviours „standing“, „eating“, „lying“, „occupation with bedding“ and „other“ were generated. The application of straw bedding caused a significantly higher frequency and longer total duration of „occupation with bedding“ and accordingly shorter fractions of „standing“ and „other“. Furthermore, the total duration of lying on straw bedding was significantly longer than on straw pellets. The individual horse had a significant influence on all types behaviour.

Keywords

Horse, bedding material, behaviour, single stalls

Abstract

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■ The predominant form of stabling riding horses in Germany is in single stalls [1]. In this type of husbandry system, the horses are directly subjected to the influences of the stable environment for the major part of the day (often up to 23 hours) [1; 2]. The bedding has a decisive influence on the generation of dust and noxious gases, and so on the air quality within the stall. It is well known that such dust and noxious gases in the stable air can induce severe respiratory disease, while inadequately maintained bedding can lead to hoof problems [3; 4]. It is, however, unclear as to which extent the behaviour of horses can be influenced by the type of bedding.

The present investigation was undertaken within the framework of a study focussed on the effects of standard bedding materials on the stable environment [5]. The aims of this investigation were to determine whether and to which extent bedding material affects the behaviour of horses.

Materials and Methods

The investigation was undertaken in a stable in Lönningen (County of Cloppenburg, Lower Saxony, Germany) between 26 January and 4 September, 2006. Four warmblood mares (two with foals) were kept in single stalls in the stable. In three tri-

als each lasting 6 weeks, the stalls were strewn for the first two weeks with straw pellets (Biolan, Raiffeisen Waren-Zentrale Rhein-Main eG, Germany; Weeks 1 and 2), then with dust-removed wood shavings (softwood shavings from Goldspan, Göttingen, Germany; Weeks 3 and 4) and finally with wheat straw (length ca. 20-30 cm; Weeks 5 and 6) (Fig. 2). During the two weeks in which a bedding material was used, the stalls were not cleaned out; only the daily faeces were removed. With the straw bedding, a set amount of additional straw (11 kg/day/stall) was strewn each day.

Fig. 1



Video cameras recorded the behaviour of the horses in the experimental stall

Fig. 2



Analyzed bedding materials. From left: wood shavings, wheat straw and straw pellets

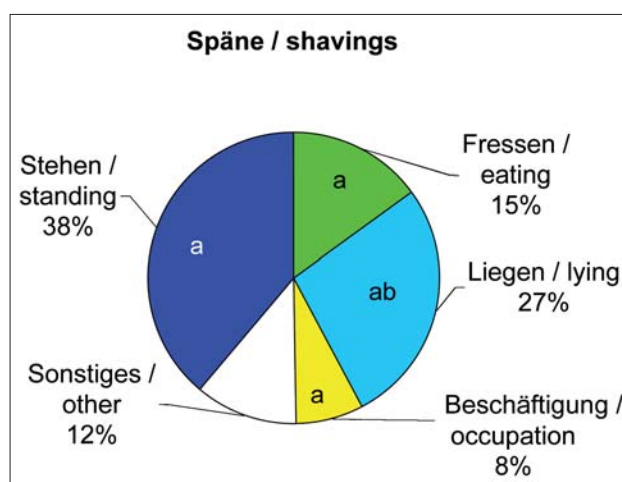
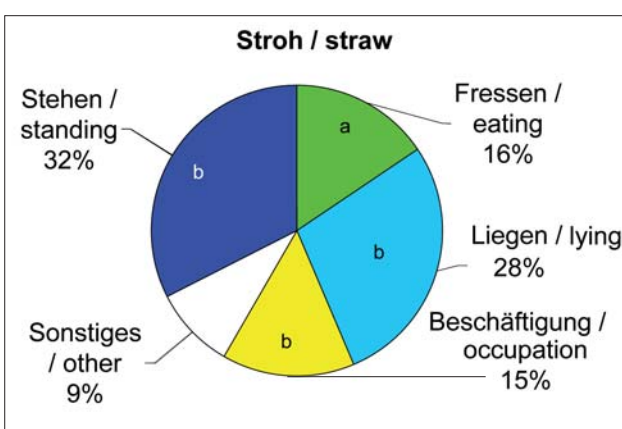
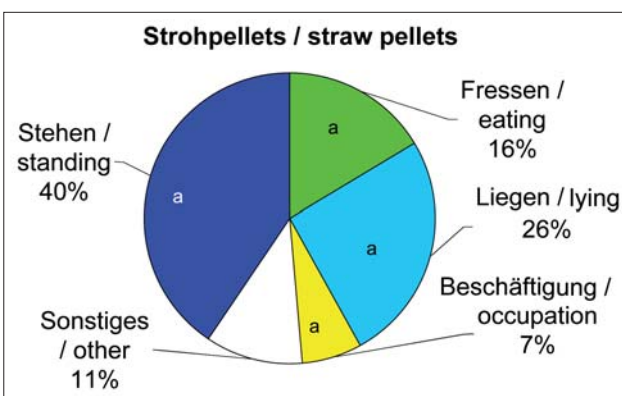
The horses were given a rationed amount of hay each day, whereby the hay was placed outside the stall in three of the stalls and inside the stall in one (Stall 2: Mare 2 with Foal 2). In the third and final trial, the behaviour of the horses within their stalls was recorded with video cameras over the first three days and last three days of each bedding type (Fig. 1). The recordings were assessed continually. The horses were allowed out to grass for a minimum of 6 hours each day and the recordings were interrupted for this period of time. The total daily observation time was therefore 15 hours per day. Each horse was observed for a total of 6 days per bedding material. Time budgets were generated for the behaviours “standing”, “eating”, “lying”, “occupation with bedding” and “other”. The category „other“ included less frequent behaviour patterns or those that had a short duration: drinking, stilling, investigation of the stall, movement, rolling, grooming, tail rubbing, flehmen, aggression, defecation and urination. The statistical evaluation of the data was done using SAS 8e (SAS Institute Inc., Cary, NC, USA, 1999-2000).

Results and Discussion

The observations showed that the straw bedding was associated with a significantly greater frequency and longer duration of “occupation with bedding”, resulting in a lower frequency and shorter duration of “standing” and “other” (Fig. 3). With respect to the well-being of the horse, it appears that of the three bedding types tested straw is the bedding which is the most suited to the horse’s requirements as the longer the time spent playing with the bedding and the shorter the time spent standing reduces the risk that stereotypy develops [6]. This result is in agreement with the findings of MILLS ET AL. [7] with respect to the bedding preferences of thoroughbreds. The horses’ behaviour in the variants straw and straw pellets also differed significantly with respect to the time spent lying, whereby the time was longer with straw. The time spent lying on wood shavings did not significantly differ from that of the other two types of bedding. Investigations undertaken by HUNTER ET AL. [8] also did not show any differences between straw and wood shavings. In contrast, FADER ET AL. [9] found a longer length of time spent lying on wood shavings in comparison to straw. The longer time spent lying on straw in this investigation indicates a possibly better sense of well-being in the horses with respect to this type of bedding.

It was also found that the individual horses had a highly si-

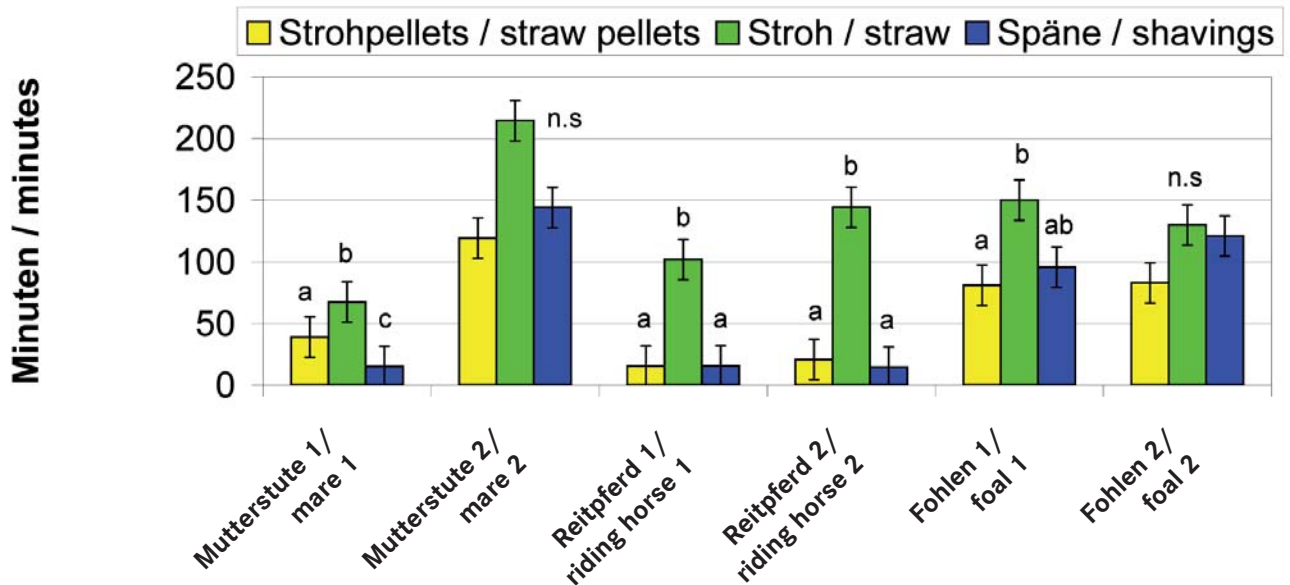
Fig. 3



Time budgets calculated for the different types of behaviour while the horses were in the stalls according to bedding types ($n = 108$; observation period 15 h; a, b = different letter indicate significant differences between the materials for the respective behaviour $P < 0,05$).

gnificant influence on all of the behaviours investigated. This is shown in Fig. 4 with respect to “occupation with bedding”. The composition of the experimental group – two dams, two foals, a five-year-old (Riding horse 1) and an eighteen-year-old (Riding horse 2) – was highly heterogeneous and so made the

Fig. 4



Mean total duration and standard error of "occupation with bedding" (in 15 h) according to horses and bedding in minutes ($n = 108$; a, b, c = different letter indicate significant differences between the materials in each respective horse, $P < 0,05$; n.s. = not significant)

interpretation of the observed differences very difficult. Despite this, all of the horses spent the longest time on "occupation with bedding" when bedded on straw, though this was not significantly longer in Mare 2 and Foal 2 than with the other types of bedding. This latter result was considered to be due to the feeding of hay within the stall (the hay fed to the other horses was placed outside the stall). Due to the presence of the hay within the stall there was a mixing of the feed with the bedding, so that the "occupation with bedding" was prolonged due to the horses searching for hay within the bedding as the hay was rationed. While a horse is occupied with the bedding, its head is on the floor which under natural conditions is the physiological posture of the horse for more than half the day. In addition, such preoccupation has an important well-being function which should be fulfilled by bedding – especially for horses kept on their own – and has a large influence on the humane aspects of the husbandry system [10; 11].

Conclusions

There was a strong degree of individual variation in the behaviour of the horses. The bedding material influenced the behaviours "occupation with bedding", "standing" and "lying". With respect to the animal's well-being, straw appears to be the best of the three types of bedding investigated as it was associated with a longer time spent being occupied and lying in comparison to the straw pellets and wood shavings. In addition, due to the results of the horses' behaviour, it is recommended to feed hay rations within a horse's stall so that the time spent occupied is prolonged. This is considered prudent as when a horse is more preoccupied while held in a stall, it improves the

species-specific suitability of the husbandry system and helps to prevent the development of stereotypic behaviour [12].

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