

Effect of different bedding material on redirected behaviour and vices of thoroughbred race horses housed in stalls

ABDUL MATEEN K. W.¹, UDAY KUMAR², MAHADEVAPPA D. GOURI^{3*}, VIVEK M. PATIL⁴,
RAJESHWARI Y.B.⁵, PRASANNA S.B.⁶ and UMASHANKAR B.C.⁷

*Department of Livestock Production and Management, Veterinary College, Hebbal,
Bengaluru, KVAFSU Bidar, Karnataka - 560024, India*

Received: 01.03.2023; Accepted: 05.04.2023

ABSTRACT

Frustration arising from lack of social contact and inconsistent training method, insufficient roughages, erratic management practices and different bedding material leads to redirected behaviour and vices in stabled horses. Further there was a need to assess the relation between behaviour and vices related to prevalence of many stereotypes and redirected behaviour i.e., weaving, tongue rolling, resting in the stable corner, soil consuming, wood chewing and cribbing. The aim of current research work was to establish the importance of bedding on behaviour of horses. Fifteen each of privately owned, mares and stallions were selected for the study. They were kept in the boxes in which they were observed for a minimum of four weeks. Recordings were made between 10:00 to 12 AM and 5:00 to 7:00 PM. There was an increase in the prevalence of abnormal behaviour ($P < 0.0001$) when the bedding type other than straw was used ($P < 0.0001$) and the amount of fibre in the diet was decreased (<40%). Results showed that there were significant differences in other behaviours like resting in the stable corner ($P < 0.0001$), tongue rolling ($P < 0.0001$), weaving behaviour ($P < 0.0001$), yawning behaviour ($P < 0.0001$), wood chewing ($P < 0.0005$) and cribbing ($P < 0.0008$). No significant differences were found with soil ($P < 0.558$) and faeces consumption ($P < 0.3251$) behaviour. The amount of time spent on exercise and time spent outside the stable did not appear to be related to performance of abnormal behaviour and vices of horses. It was concluded that the providing adequate bedding material can influence the behaviour and vices in stabled horses.

Key words: Horses, Bedding material, Redirected behaviour, Vices

Stereotypies, defined as repetitive, relatively invariant and apparently functionless and behaviour directed towards inappropriate target¹³. The possible causes of abnormal

behaviour include factors associated with weaning, social contact, crowding, feeding, housing and/or training practices¹¹. The choice of bedding substrate will have a significant impact on the behaviour and welfare of domestic horses that spend much of their time in artificial housing⁷. Material used as bedding can promote well-being in three ways. First, it may contribute to the physical and thermal comfort of the individual. Secondly, it may facilitate play or other time-consuming activities. Thirdly, it may help compensate for a lack of bulk in the diet. The main function of the bedding material is to absorb the moisture, absorption of excrement, protection from mechanical insult, cushioning the horse's legs against concussion, thermal isolation,

1. Veterinary Officer, Dept. of AH & VS, Yadgir, Karnataka.
2. Veterinary Officer, Dept. of AH & VS, Bidar, Karnataka.
3. *Corresponding author: Assistant Professor LPM, Veterinary College Bengaluru, Karnataka.
e-mail: mdgouri@rediffmail.com
4. Associate Professor & Head, LPM, Veterinary College Bengaluru, Karnataka.
5. Ret'd Professor & Head, LPM, Veterinary College Bengaluru, Karnataka.
6. Associate Professor, LPM, Veterinary College Gadag, Karnataka.
7. Principal, Animal Husbandry Polytechnic, LRIC (A), Konehalli, Tiptur, Karnataka.

prevention of draft, improvement of skid and slip resistance, and the occupation of the horses; so that it is possible to maintain a dry ground and optimum microclimate parameters in the stables¹⁸. The use of any bedding material other than straw was associated with a higher incidence of stereotypic activities such as weaving¹⁴.

Behavioural indicators appear to be advantageous since behavioural changes are often the earliest signs that can be found to indicate sub-optimal conditions¹⁰. There are reports that straw pellets and straw were preferred over wood shavings as bedding material⁸. It has also been reported that improper welfare practices and stress conditions due management practices, prolonged confinement, use of low fiber and high energy diet and improper or non-usage of bedding materials may lead stereotypic or abnormal behaviours stall fed equines⁹. It has been reported that horses often crib on wood rather than metal materials; they will crib on metal structures if a wooden substrate is not available¹.

Hence the current study was undertaken with the objective of establishing the importance of bedding on behaviour of horses.

MATERIALS AND METHODS

The study examined the prevalence of the following six behavioural patterns:

- *Weaving*: an obvious lateral swaying movement of the head, neck forequarters and sometimes the hindquarters.
- *Crib biting and or wind-sucking*: an oral-based behaviour frequently involving the horse grasping a fixed object with its incisor teeth and engulfing air with an audible grunt.
- *Wood-chewing*: a redirected behaviour involving the horse chewing wood from a number of different sites within its stable.
- *Resting in stable corner*: a redirected behaviour involving resting of horses in the corner of stable for long period.

- *Soil consuming*: a redirected behaviour involving eating of soil from the ground and igging from the stable wall.
- *Tongue rolling*: an oral-based behaviour frequently involving rolling of tongue in circular fashion continuously without any break for more than 5 to 10 minutes.

The study was conducted in one of the biggest riding clubs in Bengaluru, housing about 1500 horses. All horses used in the study were privately owned. Thirty horses, with approximate age between three to four and half years, were randomly divided into three groups, with each group containing ten horses. Their height ranged from 1.60 to 1.76 m (mean, 1.68 m). Fifteen of the horses were mares and 15 were stallions.

The horses used in the study were housed in three different parts of the stable. They were all stabled in boxes measuring 3×3 m and subjected to the same feeding and management routine. They had been kept in the boxes in which they were observed a minimum of four weeks. They were unable to see their next-door neighbor because of a tall wooden board, but they were able to see the horses stabled on the opposite side of the corridor through bars. They were fed a mixture of oats and a supplement, and hay (dry or silage) at 6:30 AM, 10:45 AM, and 4:30 PM.

Ten horses were stabled on wheat straw (~15 cm long, dry matter content 87-88%) and ten on oven-dried wood shavings (80% spruce and 20% pine, dry matter content 82%) and ten horses without any bedding. The activity of each horse was recorded on a chart containing different behavioural patterns for a period of four weeks. Recordings were made between 10:00 AM to 12 noon and 5:00 to 7:00 PM.

RESULTS AND DISCUSSION

Many vices such as cribbing behaviour, faeces consumption behaviour, tongue rolling, weaving, and wood chewing were commonly observed in the horses.

Resting at stable corner: Bedding material had

significant ($P<0.0001$) influence on the resting at stable corner behaviour of horses under study, indicating better welfare status. Horses reared without bedding material (6.88 ± 0.316) showed significantly lower resting behaviour as compared to horses reared on wood shavings (9.35 ± 0.441) and straw (10.38 ± 0.4635) which, however, did not differ from each other.

Tongue rolling behaviour: Bedding material had significant ($P<0.0001$) influence on the tongue rolling behaviour of horses under study. Horses reared without bedding material (2.57 ± 0.427) showed significantly lower welfare status with regard to tongue rolling behaviour as compared to horses reared on wood shavings (6.09 ± 0.792) and straw bedding (8.952 ± 0.983).

Weaving behaviour: Bedding material had significant ($P<0.0001$) influence on weaving behaviour of horses under study. Horses reared on straw bedding material (24.86 ± 1.380) showed significantly higher weaving behaviour as compared to horses reared on the wood shavings (16.64 ± 1.187) and without bedding material (13.90 ± 0.572).

Wood Chewing behaviour: Bedding material had significant ($P<0.0005$) influence on wood chewing behaviour of horses under study.

Horses reared on straw bedding material (1.07 ± 0.150) and wood shavings (0.73 ± 0.177) showed significantly higher welfare status with respect to wood chewing behaviour as compared to horses reared without bedding (0.26 ± 0.090).

Cribbing behaviour: Bedding material significantly ($P<0.0008$) influenced the cribbing behaviour of horses. Horses reared without bedding material (27.38 ± 1.043) showed significantly lower welfare status when compared to horses reared on the wood shavings (40.83 ± 2.282) and straw (47.36 ± 2.463).

Yawning behaviour: Bedding material had significant ($P<0.0001$) influence on the yawning behaviour of horses under study. Horses reared without bedding material (4.54 ± 0.410) showed significantly lower welfare status with regard to yawning behaviour when compared to horses reared on the wood shavings (9.69 ± 0.627) and straw (9.26 ± 0.597) which, however, did not differ from each other.

Faeces consuming behaviour: Bedding material was found to have non-significant ($P<0.5558$) effect on the faecal ingestive behaviour in the present study.

Soil consuming behaviour: This was not

Table 1: Effect of bedding material on welfare status of horses with regard to different vices.

Sl. No.	Parameter	Without Bedding (T1)	Wood Shavings (T2)	Straw Bedding (T3)	P-Value
1	Cribbing behaviour	27.38 ± 1.043^a	40.83 ± 2.282^b	47.36 ± 2.463^b	0.0008
2	Faeces consuming behaviour	1.14 ± 0.203	1.47 ± 0.236	1.26 ± 0.218	0.5558
3	Soil consuming behaviour	2.18 ± 0.012	2.27 ± 0.018	2.31 ± 0.339	0.3215
4	Resting stable corner	6.88 ± 0.316^a	9.35 ± 0.441^b	10.38 ± 0.4635^b	0.0001
5	Tongue rolling behaviour	2.57 ± 0.427^a	6.09 ± 0.792^b	8.95 ± 0.983^b	0.0001
6	Weaving behaviour	13.90 ± 0.572^a	16.64 ± 1.187^a	24.86 ± 1.380^b	0.0001
7	Wood chewing behaviour	0.26 ± 0.090^a	0.73 ± 0.177^b	1.07 ± 0.150^b	0.0005
8	Yawning behaviour	4.54 ± 0.410^a	9.69 ± 0.627^b	9.26 ± 0.597^b	0.0001

significantly ($P < 0.3251$) influenced by the type of bedding material.

Wood shavings used by most trainers were more absorbent than straw, and they are rarely eaten by the thoroughbred horses, whereas, straw bedding was eaten by the horses². This may explain why horses that were bedded on straw had fewer stereotypies than horses bedded on wood shavings. Bed eating is a redirected behaviour⁴, that involves the ingestion of bedding substrates such as straw, paper or shavings¹⁶. This behaviour is more common in horses that do not have access to high-fibre forages such as hay, and it is more common in horses that are bedded on straw than those on rubber, paper or shavings. In the current study also, it was observed that the horses provided with bedding materials viz., wood shavings and straw had higher welfare status with respect to stereotypic behaviours as compared to horses reared without bedding material. Similar observations were made in earlier studies^{2,4,16}.

CONCLUSION

The vices of horse are mainly due to stress and lack of some of the management practices which includes feeding, housing and exercise. In the present study many vices are encountered like cribbing, wood chewing, weaving, tongue rolling, faeces consumption, accumulation of bedding material and standing in corner of the stable. Among these, weaving and faeces consumption were encountered in straw bedding whereas the rest were due to lack of proper management. Bedding material does influence horse behaviour. Straw seems to support the welfare of horse as compared to wood shavings; however, further investigation with large number of animals is necessary to verify the observed reactions.

REFERENCES

1. Albright, J. D., Mohammed, H. O., Heleski, C. R., Wickens, C. L., and Houpt, K. A., 2009. Crib-biting in US horses: breed predispositions and owner perceptions of etiology. *Equine. Vet. J.*,41: 455-458
2. Alison Glen Mactaggart and Clive Julian Christie Phillips 2023. Validating a Thoroughbred Racehorse Welfare Index through Horse Behaviour and Trainers' Reports of Welfare Issues in Their Horses. *Animals*, 13 (2), 282; <https://doi.org/10.3390/ani13020282>.
3. Brown, J. H. and Smith, V. P. 1994. *Horse and Stable Management*, Blackwell, London. pp16.
4. Cooper, J.; McGreevy, P. Stereotypical behaviour in the stabled horse: Causes, effects and prevention without compromising horse welfare. In *The Welfare of Horses*; Waran, N., Ed.; Springer: Dordrecht, The Netherlands, 2007; pp. 99–124. [Google Scholar]
5. Canali, E. and Borroni. A. 1994. Behavioural problems in thoroughbred horses reared in Italy. *Applied Animal Behaviour Science*. 40 (1); Page 74. [https://doi.org/10.1016/0168-1591\(94\)90096-5](https://doi.org/10.1016/0168-1591(94)90096-5).
6. Duncan. I.J.H..Rushen. I. and Lawrence, A.B. (1993) Conclusions and implications for Animal Welfare. In: *Stereotypic Animal Behaviour; Fundamentals and Applications to Welfare*.Eds: A. B.Lawrence and J . Rushen. CAB International, Wallingford. pp 193-206.
7. Fraser, D., Phillips, E A., Thompson, B. K. and Tennessen, T.1991. Effect of straw on the behaviour of growing pigs.*Appl. Anim. Behav. Sci.*,30: 307-118.
8. Hanna WerhahnEngel F. HesselEngel F. Hesselrene BachhausenHerman F. A. Van den Weghe. 2010. Effects of Different Bedding Materials on the Behaviour of Horses Housed in Single Stalls. *Journal of Equine Veterinary Science*. 30 (8):425-431 DOI: 10.1016/j.jevs.2010.07.005
9. Ilaria Arena, Giovanna Marliani, Stefano Sabioni, Gianfranco Gabai, Diego Bucci, and Pier Attilio Accorsi. 2021. Assessment

- of horses' welfare: Behavioural, hormonal, and husbandry aspects. *Journal of Veterinary Behaviour*. 41, January–February issue., Pages 82-90
10. Keeling, L. and Jensen, P., 2009. The ethology of domestic animals. 2nd edn. Jensen P, CAB International. *Abnormal Behaviour, Stress and Welfare*.
 11. Luescher, U. A., Mckeown, D. B. and Halip, J. 1991. Reviewing the causes of obsessive–compulsive disorders in horses. *Vet. Med.*, 86:527–530.
 12. Marsden. M. D. 1993. Feeding practices have greater effect than housing practices on the behaviour and welfare of the horse. *Livestock Environment 4th International Symposium of the American Society of Agricultural Engineers*. University of Warwick, Coventry. pp 314-3 18
 13. Mason, G. J. 1991. Stereotypies: a critical review. *Anim. Behav.* 41: 015-1037
 14. McGreevy, P. D., Cripps, P. J., French, N. F., Green, L. E., and Nicol, C. J., 1995. Management factors associated with stereotypic and redirected behaviour in thoroughbred horses. *Equine Vet. J.*, 27: 86-01
 15. McGreevy P.D. 2004. *Equine behaviour: a guide for veterinarians and equine scientists*. 1st edn. W.B.Saunders.
 16. Mills, D.; Eckley, S.; Cooper, J.J. 2000. Thoroughbred bedding preferences, associated behaviour differences and their implications for equine welfare. *Anim. Sci.*, 70, 95–106. [Google Scholar].
 17. Ralston, S. L., Van Den Broek. G. and Baile, C. A. 1982. Feed Intake patterns and associated blood glucose free fatty acid and insulin changes in ponies. *J. anim. Sci.* 49: 838-847 Ulmer GmbH & Co., Stuttgart (Hohenheim).
 18. Zeitler-Feicht, M. H. 2008. *Handbuch Pferdeverhalten. Ursache, Therapie und Prophylaxe von Problemverhalten*. Verlag Eugen.