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Effect of different bedding materials on cleanliness score and gastro intestinal parasitic profile of intensively reared Hassan lambs

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Abstract

The study was carried out to ascertain the effect of different bedding material on cleanliness score and internal parasites in Hassan lambs. Eighteen, grower lambs of either sex with average body weight of 13.38 ± 0.54 kg and aged between 3-6 months were selected and allotted to three groups with six replications in each group and reared separately on three different bedding materials i.e. soil/mud (G I), crushed maize cob (G II) and ragi straw (G III). The animal's body (side, back and legs) was observed fortnightly and each area was given score from 0 to 2 (0- Cleanest to 2- Dirtiest) to arrive at a comprehensive dirt score. Faecal droppings were observed daily and consistency was scored by using a diarrhoea score scaling system ranging 1 to 4 (1= Watery; 2 = Runny; 3 = Soft; 4 = Normal). The Gastro Intestinal parasitic load in terms of eggs per gram of feces (EPG) was determined at every three week interval. The highest dirt score was recorded in G III and G II lambs were cleaner than other two groups. The differences were significant between the groups. The lambs of G II and G III showed marginally higher diarrhoea score values, than G-I ($P>0.5$). The OPG values varied significantly between G I and G II during the experiment. The study showed better performance of lambs reared on ragi straw bedding material.

Keywords: Cleanliness, bedding material, EPG, Hassan lambs

Introduction

Sheep rearing in India is a prominent animal husbandry activity across various agro-climatic regions. It provides a source of income as well as nutrition to the farming community and stands guarantee against losses incurred with crop agriculture. Profitable rearing requires scientific shelter for them and a suitable bedding material in the sheep shed enriches their micro climate and provides additional comfort to the animals. An ideal bedding material should be hygienic, dry, resilient and reasonably temperature resistant, provide insulation and comfort to the sheep. Various kind of materials, based on their economic value can be considered as long as they serve the purpose and available readily. Under intensive production systems, bedding materials used should ensure better comfort by enough resting time, so that their welfare and productivity are guaranteed [1]. The type of bedding used in sheep will influence their behaviour and comfort thereby having an indirect effect on their productivity and well being.

Materials and Methods

The study was carried out at the institutional livestock farm complex with a total of 18 healthy Hassan breed, lambs of 3-8 months old. The lambs were allotted randomly into three groups of six lambs each and fattened for three months. Each group was reared under intensive rearing system with three different bedding materials i.e. Group-I (G I) - Mud/Soil; Group II (G-II) - Maize cob as bedding material and Group-III (G III) - Ragi straw as bedding material. The maize cobs were crushed coarsely before being used as bedding material.

Each animal was individually identified and provided a space of 0.9 m² (Bureau of Indian Standards) and a total pen size of 70ft² was provided to each group including space for feeder and waterer. The bedding materials of at least six inches depth was maintained uniformly throughout the study period. Roughages (locally available green forages) and the concentrate mixture formulated with locally available feed ingredients were offered to the animals. The feed/concentrates were provided as per the prescribed standards (ICAR, 2013). Clean and potable drinking water was made available round the clock.

a) Dirt score or cleanliness score

The animal's body (side, back and legs) was observed and each area was given score from 0 to 2 (0= Cleanest to 2= Dirtiest) to arrive at a comprehensive Dirt Score (Hansen *et al.*, 2012) as detailed below;

- **Side and back:** 0 = Clean, 1 = <25% dirt, 2 = >25% dirt;
- **Legs:** 0 = Clean, 1 = dirt up to hocks/elbows, 2 = dirt up to belly.

The scoring was done at fortnightly intervals.

b) Diarrhoea score: Faecal droppings were observed daily and consistency was scored by using a diarrhoea score scaling system, ranging from 1 to 4 (1= Watery; 2 = Runny; 3 = Soft; 4 = Normal) as per Aysigi *et al.*, (2005).

c) Gastro intestinal parasitic load (EPG)

The Gastro Intestinal parasitic load in terms of eggs per gram of feces (EPG) was determined at every three week interval. Faecal samples were collected directly from the rectum of the animals and the faecal egg count and oocyst count was performed by modified McMaster technique (Anon, 1977).

Results and discussion

a) Dirt score or cleanliness score

The dirt score of Hassan lambs reared on three different bedding materials is recorded at fortnightly interval and (Table 1 and Fig 1) it was significant ($P<0.05$) among the animals during the 1st, 2nd, 4th, 5th and 6th fortnights, whereas it was non-significant during the 3rd fortnight. Significantly ($P<0.05$) lowest dirt score was recorded in lambs reared on ragi straw (G III) than those reared on maize cob (G II) and mud (G I) from first to sixth fortnights. The overall mean

values of dirt score was 1.42 ± 0.07 , 1.26 ± 0.06 and 0.82 ± 0.06 , in G I, G II and G III, respectively. The dirt score values of lambs in G I, was comparatively higher than those in G III. The highest dirt score was recorded in lambs reared on mud floor than those on maize cob whereas, the lambs reared on ragi straw (low score) were cleaner than other two groups. These differences between dirt scores were significant ($P<0.05$) during the experiment.

Table 1: Dirt score of lambs reared on different bedding materials

Dirt score	Group I	Group II	Group III	P Value
1 st Fortnight	1.25 ± 0.17^{ab}	1.42 ± 0.15^b	0.83 ± 0.10^a	0.035
2 nd Fortnight	1.08 ± 0.20^{ab}	1.42 ± 0.15^b	0.75 ± 0.17^a	0.053
3 rd Fortnight	1.17 ± 0.16	1.08 ± 0.15	0.75 ± 0.21	0.255
4 th Fortnight	1.58 ± 0.08^b	1.25 ± 0.17^{ab}	0.92 ± 0.50^a	0.015
5 th Fortnight	1.92 ± 0.08^b	1.17 ± 0.16^a	0.76 ± 0.16^a	0.010
6 th Fortnight	1.50 ± 0.00^b	1.25 ± 0.17^{ab}	0.91 ± 0.20^a	0.049
Overall Mean	1.42 ± 0.07	1.26 ± 0.06	0.82 ± 0.06	0.001

^{a,b,c} Means bearing different superscripts in a row differ significantly ($P<0.05$)

The dirt score or cleanliness score is an important indicator for determination of cleanliness of animal and cleanliness management could help us to control the incidence of infectious diseases and monitoring comfort levels. The dirt score was significant ($P<0.05$) in the 1st, 2nd, 4th, 5th and 6th fortnights whereas, it was non-significant during the third fortnight among the animals reared on three bedding materials. Significantly ($P<0.05$) lowest dirt score was recorded in lambs reared on ragi straw (G III) than maize cob (G II) and mud (G I) from 1st to 6th fortnights. In G I, the dirt score value was comparatively higher than G III. The highest dirt score was recorded in lambs reared on mud, i.e. dirtier than these lambs on maize cob bedding whereas, the lambs reared on ragi straw (low score) were cleaner than lambs on maize cob and mud bedding materials. This could be due to higher moisture absorbing ability of ragi straw bedding materials than the maize cob and mud bedding materials. The dairy cattle on rubber mats were significantly dirtier than those on rubber strips or straw [2]. The present findings i.e. no significant effect of bedding type on the cleanliness score was supported [3-9] by similar other research works whereas, contradictory findings in which the bedding material significantly affecting the cleanliness score [10, 11, 12] were also recorded.

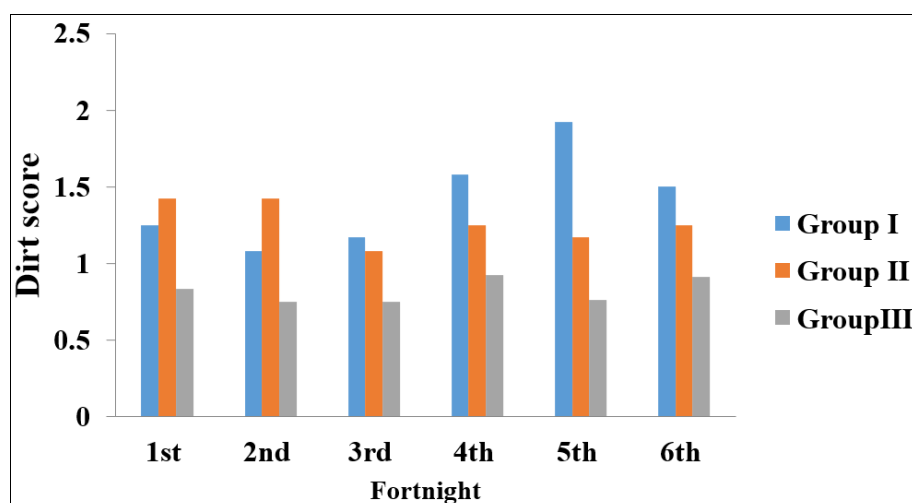


Fig 1: Dirt score of lambs reared on different bedding materials

b) Diarrhoea score

The observed overall mean diarrhoea score between 0-30th day of the experiment was 3.82 ± 0.05 , 3.82 ± 0.02 and 3.84 ± 0.03 and at the 60-90th day of experiment, the same was 3.86 ± 0.02 , 3.88 ± 0.01 and 3.90 ± 0.01 in the lambs of G I, G II and G III, respectively (Table. 2) The overall mean values of diarrhoea score was 3.84 ± 0.01 , 3.85 ± 0.01 and 3.88 ± 0.06 , respectively in G I, G II and G III. The lambs of G II and G III showed marginally higher diarrhoea score values, than G I. However, the differences were non-significant.

Table 2: Diarrhoea score of experimental lambs on different bedding materials

Duration	Groups			P Value
	I	II	III	
0-30 day	3.82 ± 0.05	3.82 ± 0.02	3.84 ± 0.03	0.790
30-60 day	3.83 ± 0.03	3.84 ± 0.04	3.90 ± 0.03	0.144
60-90 day	3.86 ± 0.02	3.88 ± 0.01	3.90 ± 0.01	0.433
Overall Mean value	3.84 ± 0.01	3.85 ± 0.01	3.88 ± 0.06	0.086

The observed overall values of diarrhoea score were 3.84 ± 0.01 , 3.85 ± 0.01 and 3.88 ± 0.06 , in G I, G II and G III, respectively. In G II and G III, the diarrhoea score value was marginally higher than G I. The difference between diarrhoea score was non-significant ($P > 0.05$) during the experiment [13]. The reason of marginally lower value in G I could be due to increased incidence of diarrhoea.

Stress inducing factors such as changes in feeding of animals or environmental conditions are often associated with imbalances in the intestinal microbial population, which increases the risk of diarrhoea [14]. Prevalent hygienic condition and parasitic load may be attributed to the variations in the scores.

c) Gastro intestinal parasitic load (EPG)

The Gastro Intestinal parasitic load in terms of eggs per gram of faeces (EPG) was determined at every three week interval and represented in Table 3. The overall mean EPG values were, 3.95 ± 0.91 , 3.93 ± 0.19 and 4.04 ± 0.20 in G I, G II and G III, respectively whereas, the overall mean OPG values were, 6.51 ± 0.12 , 7.01 ± 0.16 and 6.25 ± 0.13 in G I, G II and G III, respectively. The OPG values varied significantly between G II and G III during the experiment.

Table 3: Gastro Intestinal parasitic load (EPG/OPG) in experimental lambs reared on different bedding materials

Attributes	Groups			P Value
	I	II	III	
LNEPG(Log _e {egg per gram+100})				
0 day	3.27±0.07	3.32±0.10	3.38±0.16	0.793
21 day	3.98±0.21	4.26±0.19	3.87±0.25	0.485
42 day	3.93±0.21	3.87±0.19	4.02±0.19	0.873
63 day	4.10±0.24	3.78±0.13	4.44±0.13	0.058
84 day	4.49±0.11	4.44±0.13	4.49±0.12	0.955
Mean value	3.95±0.91	3.93±0.19	4.04±0.20	0.746
LNOPG(Log _e {oocyst per gram+100})				
0 day	5.42±0.08	5.59±0.15	5.33±0.03	0.235
21 day	6.57±0.11 ^{ab}	7.01±0.19 ^b	5.94±0.37 ^a	0.031
42 day	6.68±0.22 ^{ab}	7.22±0.25 ^b	6.34±0.09 ^a	0.027
63 day	6.79±0.10 ^a	7.40±0.08 ^b	6.82±0.20 ^a	0.013
84 day	7.08±0.20 ^a	7.81±0.24 ^b	6.83±0.18 ^a	0.014
Mean value	6.51±0.12	7.01±0.16	6.25±0.13	0.010

^{a,b,c}Means bearing different superscripts in a row differ significantly ($P < 0.05$)

The observed mean values of EPG were comparable in all the

groups. The log transformed values of eggs per gram of faeces (EPG) were 3.95 ± 0.91 , 3.93 ± 0.19 and 4.04 ± 0.20 , respectively, on G I, G II and G III. The difference between EPG values of different groups was found to be non-significant ($P > 0.05$) [7, 15, 16]. Lambs reared on ragi straw bedding materials, had relatively higher EPG than those on mud and maize cob bedding materials. This might be due to persistence of oocysts in the soil and chances of being picked up by the animals. However, the EPG count in lambs was lower than infectious threshold level among the treatments that causes infection or warrants deworming in the animals. Significantly varied EPG values [17, 18] in animals on different beddings was also recorded.

The OPG values were significantly ($P < 0.05$) higher in G II compared to G III and the values of G I and G III as well as G I and G II were comparable. Peak mean oocyst counts coincided with the weaning period and poor hygienic conditions which exaggerated the coccidial infection intensity [19].

Conclusion

The intensive system of rearing in case of Hassan lambs under different bedding material revealed that, lambs on mud floor/soil bedding had significantly low cleanliness score compared to those on maize cob or ragi straw bedding materials. The diarrhoea score in lambs on these bedding differed non-significantly during the experiment. The changes in feeding of animals or environmental conditions are often associated with the risk of diarrhoea in lambs. The mean value of EPG was comparable in all groups. The OPG values were found to be higher in lambs on maize cob or ragi straw bedding. Stress during weaning period and poor hygienic conditions contribute to enhanced intestinal parasitic load in lambs.

Conflict of Interest

Not available.

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