Bulgarian Journal of Veterinary Medicine (2005), 8, No 2, 135−139

IMPORTANCE OF MICROCLIMATE, FLOOR TYPE AND FLOOR BEDDING FOR THE INCIDENCE OF CATARRHAL RHINITIS AND LARYNGITIS IN DOGS

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Summary

Uzunova, K. I. & K. A. Koleva, 2005. Importance of microclimate, floor type and floor bedding for the incidence of catarrhal rhinitis and laryngitis in dogs. *Bulg. J. Vet. Med.*, **8**, No 2, 135−139.

An experiment was carried out with German Shepherd dogs in order to establish the role of floor type in kennels in the aetiology of canine respiratory diseases − catarrhal rhinitis and laryngitis. The tests were performed in 20 boxes with various types of floor bedding: straw, heat-insulating cardboard sheets, wood shavings, wooden slats. Catarrhal rhinitis and laryngitis were manifested only in animals reared on concrete floors without beddings. The experiment showed that materials with a low thermal conductivity coefficients should be used for floors in kennel boxes. The all year-round use of suitable bedding materials in the rearing of dogs from all ages is important in the prophylaxis of respiratory infections such as catarrhal rhinitis and laryngitis..

Key words: catarrhal rhinitis, dogs, floor, floor bedding materials, laryngitis

INTRODUCTION

Catarrhal rhinitis and laryngitis are among the commonest respiratory diseases in dogs. Although not grave, they are not desired from the point of view of animal welfare. This necessitates to investigate the hygienic aspect of the problem.

Catarrhal rhinitis is an inflammation of the nasal mucosa that could be primary, secondary, acute or chronic. Laryngeal inflammation could occur independently or together with rhinitis, pharyngitis, tracheitis and bronchitis. The disease could be acute or chronic, the former being more frequently encountered (Georgiev, 1992).

The primary factors promoting the onset of these diseases in dogs are cold and bad hygiene. They are generally related to activation of opportunistic bacterial pathogens. It is reported that the daily manual sanitization is essential for maintenance of an optimal microclimate and that it could not be replaced by any chemical or physical means (Bediak *et al.*, 1987). According to the physiological needs of target animals, the role of floor type for the appearance of respiratory diseases is emphasized (Ganivet, 1985). It is accepted that for achieving a good heat insulation of premises and especially of floors, building materials with a low thermal conductivity coefficient (λ) should be employed (Iehl, 1986). According to some investigators, if dogs are reared in warm and hygienic premises whose floors are with low thermal conductivity coefficients, there is no need for floor bedding (Lenormand, 1994). Others recommend the use of bedding materials only in newborn puppies (Quéinnec, 1986).

In order to exclude the harmful impact of cold and hard floors, an obligatory use of bedding materials is recommended in the rearing of all canine age groups (Pierson *et al.*, 1996). With this regard, various types of bedding material could be used, each having its pluses or disadvantages. The most commonly used materials are straw, heat-insulating cardboard sheets, wood shavings, rubber pads and wooden slats. For all that, the literature data about the interrelationships between the type of floor bedding material combined with the complex effect of other factors (floor type and microclimate) and the incidence of catarrhal rhinitis and laryngitis in dogs are incomplete.

The aim of the present experiment was to investigate and determine the importance of some features of microclimate and the floor bedding materials for the onset of both respiratory diseases.

MATERIALS AND METHODS

The study was performed in a kennel in February and March (experimental period of 60 days). Twenty male German Shepherd dogs weighing on the average 30 kg, at the age of 3 years were included in the experiment. Prior to the study they were working for about an year as guardians and in odorology. The kennel had 20 boxes (semi-open sheds with walking yards) and there was one dog in each box. The boxes were exposed to the south. The sheds were with a length of 150 cm and width of 200 cm, thus ensuring an area of 3 m^2 per animal, conforming to the requirements of Council Directive 86/609/EEC (Anonymous, 1986). The yards were 200 x 200 cm (area of 4 m^2 per dog). The barriers among them were composed of 2 parts: concrete (height of 120 cm) and grating-like (100 cm), that did not allow the contacts between animals.

The dogs were fed individually once daily with a commercial diet. The data about the epizootological status of the kennel for the last year showed an incidence of microsporia and cough in 4 dogs. At the time of the study, no pathology was present.

Various types of bedding material were used: 4 floors were entirely covered with straw, free from molds (thermal conductivity coefficient λ = 0.38 and layer thickness of 10 cm), 4 floors – with heat insulating cardboard sheets (λ = 0.25, layer thickness of 3 cm, area 3 m^2), 4 floors – with wooden slats (λ = 0.46, slat thickness of 5 cm, total slat area of 3 m^2, plate width of 10 cm and hole width of 4 cm), 4 floors – with wooden shavings (λ = 0.34, layer thickness of 10 cm, area 3 m^2) and 4 floors were concrete (λ = 5.24, without bedding).

The influence of the presence or lack of floor bedding material in the rearing of the 20 dogs was determined via daily monitoring of dogs' health. The body temperature was recorded by 8.00 AM in the morning and 6.00 PM in the evening. The appearance of nasal discharge and cough was monitored too. The measurements of the principal microclimatic parameters temperature (t°, ^{o}C), relative humidity of the air (R, %), velocity of the air motion (V, m/s), harmful gases were also done on a daily basis. The t° and the R in sheds and yards were determined with TZ 18T thermohygrographs. The V and the levels of harmful gases (CO_2, NH_3, H_2S) were determined by routine hygienic methods.

RESULTS

The data in Table 1 show the temperature and humidity regimen in shed and yards of canine boxes.

In the yards, the average ten-day air temperature during the 2-month period of the trial varied between 1.5 °C and 7.4 °C, the average ten-day minimal and maximum values were 1 °C – 3 °C and 5.4 °C – 12 °C, respectively. The average ten-day relative air humidity ranged between 73 % and 87 %. In sheds, the average ten-day air temperatures were between 6.8 °C and 11.4 °C, the average ten-day minimal ones varied from 1 °C to 7 °C whereas the maximum ones – from 10.5 °C to 15.9 °C. The average ten-day relative air humidity in sheds was between 67 % and 75 %.

The air motion velocity in sheds was between 0.076 m/s and 0.216 m/s, whereas in yards – from 0.283 m/s to 0.343 cm/s.

The air CO_2 content in sheds was 0.01 % – 0.03 %, and that in yards – between 0.004 % and 0.02 %; air NH_3 varied between 0.003 mg/L – 0.004 mg/L in sheds and 0.001 mg/L – 0.002 mg/L in yards. No H_2S was present in the air of either sheds or yards.

By day 20 of the experiment, in 2 dogs, housed in boxes without floor bedding, a dry cough appeared. Mucous nasal discharge was also present. The nasal mucosa was reddened and oedematous. The body temperature was 39.7 °C. After a day, the cough became more prolonged and wet. The body temperature at the be-

Table 1. Temperature and humidity regimen and air harmful gas content in boxes for housing of dogs

Decade	Sheds				Walking yards			
	t° min °C	t° average °C	t° max °C	R %	t ° min °C	t° average °C	t° max °C	R %
I	3.0	6.8	10.6	67	2.0	1.5	5.4	87
II	5.8	8.5	10.9	67	1.0	4.4	8.5	77
III	1.0	6.5	10.5	68	1.7	3.6	8.3	66
IV	4.9	9.3	12.9	73	0.4	5.2	9.7	68
V	7.5	11.2	14.3	72	2.9	7.3	11.4	79
VI	7.0	11.4	15.9	75	3.0	7.4	12.0	73

Decade	Sheds			Walking yards		
	CO_2 %	NH_3 mg/L	H_2S mg/L	CO_2 %	NH_3 mg/L	H_2S mg/L
I	0.02	0.003	-	0.02	0.002	-
II	0.01	0.003	-	0.02	0.001	-
III	0.03	0.003	-	0.003	0.001	-
IV	0.02	0.004	-	0.02	0.002	-
V	0.03	0.003	-	0.004	0.001	-
VI	0.01	0.004	-	0.003	0.001	-

R=relative humidity.

ginning of the day was 40 °C, and at the evening – 40.7 °C. A catarrhal laryngitis was diagnosed. The animals in the other 2 sheds without floor bedding showed a weak indisposition at the 15th day of the trial. A profuse nasal discharge was noticed that then dried up and obstructed the nostrils. The breathing was noisily. The skin around the nostrils was irritated by nasal discharge. A weak elevation in body temperature was present as early as the beginning of the indisposition. The morning body temperature was 39.5 °C, and the evening one – 39.8 °C. A catarrhal rhinitis was diagnosed.

The health of dogs reared in boxed with floor bedding materials did not show any deviation. No allergies were observed in dogs housed in boxes with straw bedding.

The hygienic condition in sheds whose floors were bedded with heat-insulating cardboard sheets was unsatisfactory. The sheets retained urine and faces for a very short period (one night, because of the regular cleansing), but a slight odor of ammonia was felt in the air. The NH_3 content revealed no deviation from the maximum allowed limit. The best hygienic conditions and lack of behavioural changes were present in boxes with wooden slat floors.

DISCUSSION

On the basis of our results it could be stated that during the entire period of the study, the measured ten-day average air temperatures in yards were lower by about 13 °C than the optimal for dog rearing air temperature (18 °C). The same was valid for average ten-day air temperatures in sheds, significantly lower than optimal values by about 9 °C on the average. The minimum ten-day air temperature in yards and sheds were lower than the minimum acceptable values by about 13 °C and 11 °C, respectively. The comparisons between the maximum ten-day air temperature found and the upper allowed limit for dogs (20 °C) revealed values lower by about 11 °C and 7 °C respectively (Pierson *et al.*, 1996).

The ten-day average air relative humidity in yards was higher than the optimal one for dogs (65 %) by 15 % on the average (Pierson *et al.*, 1996) and that in sheds – by 6 %.

The air motion velocity and the CO_2 content (with maximum allowable limit of 0.3 %) and the NH_3 content (with maximum allowable limit of 0.02 mg/L, Pierson *et al.*, 1996) in both sheds and yards were conforming to veterinary hygienic requirements. Those data could be related to the regular cleansing in the kennel.

The data evidenced that in the course of the experiment, there were deviations from the reference ranges for optimum temperature and humidity regimen in sheds and walking yards, the measured values being considerably lower than the normal ones. This created prerequisites for an overcooling of animals.

The appearance of both respiratory diseases could be explained by the lower temperature and high air relative humidity, from one part and by the lack of floor bedding on the other, thus resulting in a direct contact of animals with the cold concrete floor (with a high thermal conductivity coefficient). The primary role was probably that of the lack of floor bedding material, because the other dogs reared under the same temperature and humidity regimen, were healthy.

The lack of reports in literature from analogous experiments did not allow us to interpret the data in a comparative aspect. Our findings however permit us to assume that the use of floor bedding materials with a low thermal conductivity coefficient in the rearing of dogs from all ages during the winter season is required as a prophylactic means against the onset of respiratory diseases.

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* Author's translation

Paper received 28.04.2004; accepted for publication 20.04.2005

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