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THE ROLE OF CLIMATIC ENVIRONMENT IN MEAT RABBIT KEEPING

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Introduction

The role of environment in the performance and health of domestic animals is well known for every specialist. This concerns the meat rabbits, as well. There are relatively less publications in the field of meat rabbit environment, than at other domestic animal species. In Hungary, the scientific work of S. Holdas and coworkers and I. Pacs and coworkers are worth mentioning.
The aim of our series of experiment was to investigate the microclimate of a large-scale rabbit unit, the climatic environment of breeding and fattening rabbit houses and to draw conclusions from the observed defects and deficiencies.

Material and methods

The experiments were carried out in one of the largest meat rabbit unit of Hungary, in one cage level and three cage level breeding houses and in a double cage level meat rabbit fattening house. Beside the registration of air temperature and air humidity the air velocities were also measured twice daily at 4 points, respectively 8 points of the breeding and at 4 points of the fattening houses. Moreover, the state of health of rabbits were also followed with attention.

Breeds belonged to the White New-Zeland, the Californian breeds and the crosses of the two former breeds.

Results

One cage level rabbit breeding house
The main climatic elements are summarized in Table 1. From these the following conclusions can be drawn:

- in the cage of extreme corridor the yearly average temperature was only slightly less /15,7°C/ than in the cage of the central corridor /16,4°C/;
- there was but a little difference between the means of air humidities /63% and 64%/ and between the maximal values /100% and 99%/;
- the means of air velocities were suitable /0,30 m/sec and 0,28 m/sec/. The measured maxima, however, were high, which are the signs of strong draughts /3,43 m/sec and 3,64 m/sec/;
- the daily fluctuation of temperatures and relative humidities were considerable /16,0°C and 18,5°C, respectively 75% and 58%/ which were, however, of temporary character, nevertheless they influenced harmly the organism of suckling rabbits and must be considered as stressors;
- the average temperature of nest-boxes was adequate /20°C and 19,9°C/ and the same refers to the air velocities /0,25 and 0,25 m/sec/. The measured maxima /2,89 m/sec and 3,31 m/sec/ affected surely detrimentally the thermoregulation of suckling rabbit' organism.

Conclusion

The maximal temperatures of one cage level breeding houses exerted a negative effect on milk production of mothers, but similarly great daily temperature and relative humidity fluctuations and high air velocities were harmful for the suckling rabbits when they came out from the nest-boxes to the cage of their mothers.

Three cage level bredding rabbit house

In this house there were twice as much measuring points than in the former breeding house. The tendency of values was similar to the breeding house with one cage level /Table 2./, though the extreme values were lower.

Conclusion

In the rabbit house with three cage levels, as in the house with one cage level, distinguished attention should be paid to the decrease of high daily fluctuations of temperatures and relative humidities and high air velocities for the sake of health of animals.

Let us see after the exposition of the climate of the two breeding houses the formation of mortality /Figure 1./. While in the breeding rabbit house with one cage level mortality was 21,5 %, in the three cage level house only slightly more than the half of this /12,4%/.

Double cage level fattening rabbit house

Conclusion

- during the first month of the 6o.days fattening, the average temperature in spring and in summer was 2o,2°C and 25,5°C, the relative humidity 47% and 74%, in the second month 19,6°C and 24,2°C. In autumn and in winter in the first month of fattening the mean temperatures were 11,2°C and 15,3°C, the humidities 49% and 63% at the measuring points. In the second month the temperature was by 1°-3°less, than in the first month;
- in spring and in summer the daily temperature and humidity fluctuations were higher than in the autumn and in winter seasons;
- the means of the air velocities in the first 3o days of fattening at the different measuring points were fluctuating between very broad limits /o,o6 m/sec and o,4o m/sec/. The latter value was measured in summer. The

maxima surpassed hardly 1 m/sec, while in the second month of fattening, very high peak occurred - 6,16 m/sec.

Proposals

Especially the differences of climates of breeding and fattening rabbit houses at the time of weaning must be followed with special attention when the weaned rabbits are placed into a different climatic environment. According to our examinations the animals were under a multilateral stress, because beside the loading climatic influences the difficulties of feed intake must also be in connection with the increased mortality. The two-thirds of mortality fell on the first month of fattening /Figure 2./.
On the basis of our results the following proposal cam be given to the practice: it would be suitable to leave yet the weaned rabbits 8-lo days in the breeding house to get accustomed to the intake of solid feeds. Increased care should be paid for the equalization of climates of breeding and fattening rabbit houses at the time of the first two weeks of fattening.

Table 1.

Microclimate in the one cage /leve breeding/ rabbit house

Periode	In the cage of the central corridor						Nest box °C
	Temperature, °C			Relative humidity, %			
	$\bar{x}$	max.	min.	$\bar{x}$	max.	min.	
Year	16,4 ±3,64	36,o	5,o	64 ±11,61	99	2o	19,9 ±2,39
	In the cage of the extreme corridor						
	15,7 ±3,59	36,o	5,o	63 ±15,43	1oo	15	2o,o ±2,27

Year	Air velocity, m/sec											
	Central cage			Nest box			Extreme cage			Nest box		
	$\bar{x}$	max.	min.	$\bar{x}$	max.	min.	$\bar{x}$	max.	min.	$\bar{x}$	max.	min.
	o,3o ±o,2o	3,64	o,oo	o,25 ±o,26	3,31	o,oo	o,28 ±o,2o	3,43	o,oo	o,25 ±o,16	2,89	o,oo

Year	Daily temperature and relative humidity fluctuations											
	In the central cage						In the extreme cage					
	°C			%			°C			%		
	$\bar{x}$	max.	min.	$\bar{x}$	max.	min.	$\bar{x}$	max.	min.	$\bar{x}$	max.	min.
	7,1	16,o	1,o	28	58	4	7,9	18,5	2,o	37	75	5

Table 2.

Microclimate in the three cage level breeding rabbit house

Periode	Bottom cage in the central corridor						Nest box °C
	Temperature, °C			Relative humidity, %			
	$\bar{x}$	max.	min.	$\bar{x}$	max.	min.	
Year	16,4 ±3,29	33,o	4,o	65 ±11,99	1oo	23	19,8 ±2,16
	Upper cage in the central corridor						
Year	17,o ±3,68	33,o	4,o	63 ±12,91	1oo	24	19,9 ±2,16
	Bottom cage in the extreme corridor						
Year	16,o ±3,29	34,o	5,o	66 ±11,o3	1oo	32	18,5 ±2,17
	Upper cage in the extreme corridor						
Year	16,3 ±3,46	33,5	4,5	66 ±1o,56	1oo	3o	2o,o ±2,17

	Daily temperature and air humidity fluctuations							
	Central corridor below				Central corridor above			
	°C		%		°C		%	
	$\bar{x}$	max.	$\bar{x}$	max.	$\bar{x}$	max.	$\bar{x}$	max.
Year	7,9	14,5	26	61	7,o	14,5	26	61
	Extreme corridor below				Extreme corridor above			
	6,2	14,o	21	57	8,8	16,o	54	66
	Air velocities, m/sec							
	Central corridor below		Nest box		Central corridor above		Nest box	
	$\bar{x}$	max.	$\bar{x}$	max.	$\bar{x}$	max.	$\bar{x}$	max.
Year	o,29 ±o,2o	3,54	o,23 ±o,15	2,89	o,24 ±o,17	3,64	o,21 ±o,15	2,9o
	Extrem corridor below		Nest box		Extreme corridor above		Nest box	
Year	o,3o ±o,18	4,37	o,23 ±o,16	2,56	o,25 ±o,18	3,o8	o,22 ±o,16	3,o4

Table 3.

Microclimate in the two cage level fattening rabbit house

/data of upper and bottom cages in the 1st and 2nd half of fattening/

Spring and summer fattening periods								
°C			%			m/sec		
$\bar{x}$	max.	min.	$\bar{x}$	max.	min.	$\bar{x}$	max.	min.
22,5	36,5	9,o	61	loo	16	o,23	6,16	o,oo
Autumn and winter fattening periods								
11,8	24,o	3,o	56	loo	22	o,32	3,65	o,o4

Daily temperature and relative humidity fluctuations

	Spring - SUMMER				Autumn - Winter			
	Below		Above		Below		Above	
	$\bar{x}$	max.	$\bar{x}$	max.	$\bar{x}$	max.	$\bar{x}$	max.
°C	8,3	18,o	8,1	18,5	5,9	13,o	5,9	13,8
%	25	74	25	7o	23	67	24	59

FIGURE 1. MORTALITIES IN TWO RABBIT BREEDING HOUSES

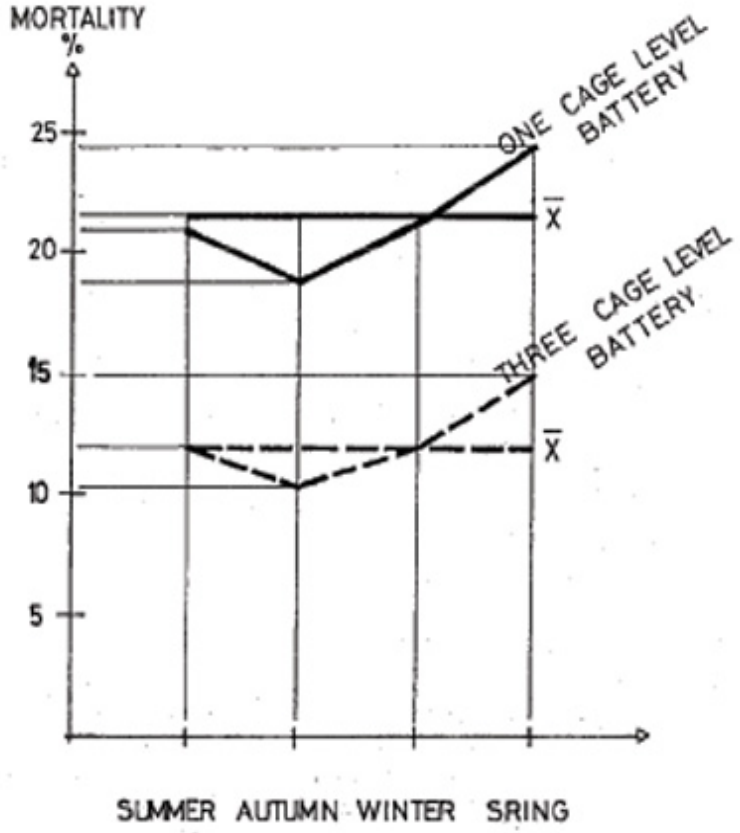
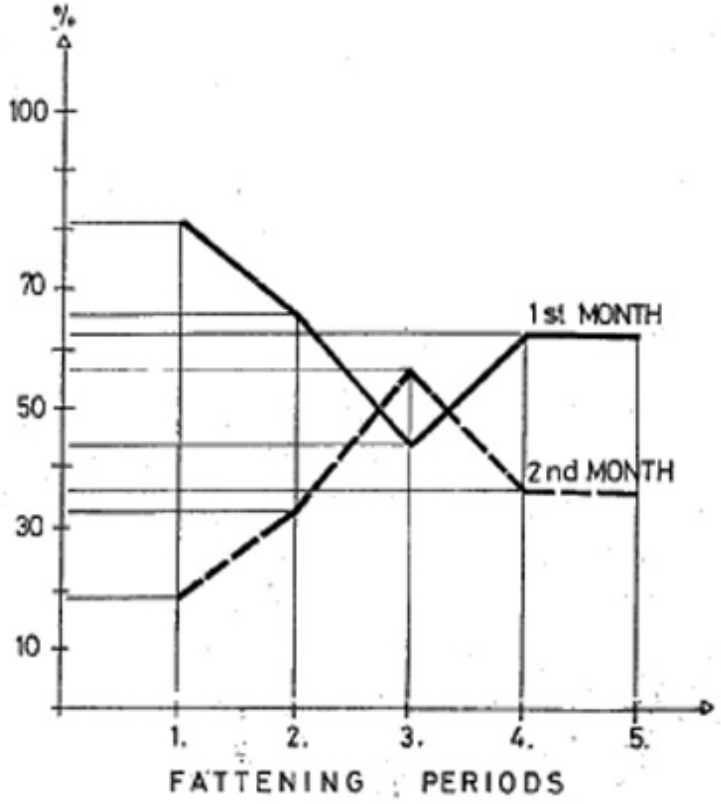


FIGURE 2. MORTALITIES IN THE FIRST AND SECOND MONTH OF FATTENING
(MORTALITY IN % OF THE WHOLE MORTALITY)



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The experiment was carried out in a large-scale rabbit unit in one cage level and three cage level breeding rabbit houses, and in a double cage level fattening rabbit house more than for one year.
Concerning the average air temperatures, relative humidities and air velocities the desired values were obtained, but several times during several hours very high and low extreme values were measured /36,5°C, 5,o°C, loo % and 3,64 m/sec/ which must be considered as stressors. The very high temperature and air humidity daily fluctuations /16°-18,5°C, resp. 58%-75%/ were measured in the one cage level house. Authors are proposing for the rabbit breeders to leave their weaned rabbits still 8-lo days in the breeding rabbit house to get accustomated to the solid feed intake and to fit the climate of fattening rabbit house - which differed very much from the climate of the rabbit breeding houses - to the climate of the breeding rabbit house.

Die Versuche wurden in Zuchtkaninchenställen mit ein und drei Käfigetagen und in einem Mastkaninchenstall mit zwei Käfigetagen mehr als ein Jahr durchgeführt.
Bezüglich der Lufttemperatur, Luftfeuchtigkeit und Luftgeschwindigkeit hat man die gewünschten Werte gemessen, aber mehrmals hat man innerhalb einiger Stunden hohe und niedrige Extremwerte festgestellt /36,5°C, 5,o°C, loo % und 3,64 m/sec/, die als Stressoren angesehen werden sollten. Die sehr hohen täglichen Temperatur- und Luftfeuchtigkeitsschwankungen /16°-18,5°C, bzw. 58%-75%/ hat man in dem Zuchtkaninchenstall mit einer Käfigetage gemessen.
Die Verfasser schlagen den Kaninchenzüchtern vor, die abgesetzten Kaninchen noch 8-lo Tage im Zuchtkaninchenstall zu halten, damit sich die Tiere an die Aufnahme des harten Futters gewöhnen, und das Klima des Maststalles dem Klima des Zuchtstalles anzupassen.