

RESEARCH OF THE MICROCLIMATE IN SHEEP SHELTERS IN BIHOR

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Abstract. *Due to our country's climatic conditions and based on the biological characteristics of their species, the sheep have to be sheltered in Romania during the winter in order to protect them from winds, snow, blizzards, and humidity. This sheltering usually lasts between 150 and 165 days. This period of sheltering coincides with those of pregnancy, delivery, and partially, with the nursing of the lamb. A shelter shall insure optimal microclimate conditions (temperature, humidity, and absence of air drafts) as well as an appropriate living area, which will insure the complete productive potential of the sheep.*

Key words: sheep, sheltering, temperature, air drafts.

INTRODUCTION

Along with the development of sheep was given a particular importance for the building of shelters used especially in winter, between the stalls to allow exteriorization full productive potential and maintaining health. By building modern shelters provided with air conditioning is performed inside an artificial environment. Microclimate shelters include all biotic and abiotic ambient, which by their action simultaneously and successively favorable or unfavorable health and animal production (MAN C., 1972).

In terms of hygiene, shelter microclimate that enables health without effort and without adaptive uneconomical consumption of feed and allows full productive potential externalization is called optimal microclimate, microclimate and comfort.

MEANS AND PROCEDURE

The study was performed on two closed and two open sheepfolds located 30 km away from Oradea. The physical characteristics of the microclimates were analyzed using the following procedures:

- The ambient temperature was recorded using thermo-hygrographs and the average values were calculated based on this data.
- The speeds of the air drafts were evaluated using a "Hill" catathermometer.

RESULTS AND DISCUSSION

The closed sheepfold, having an “U” shape, shelters 500 sheep of “Turcana” species. Its area is 952m². At one of the ends and separated from the main shelter by small pens, are sheltered the ewes ready to deliver. This way, an average area of 1.9m² is insured for each individual sheep. The open sheepfold has an area of 320 m², with three walls and open in the front. At one of the ends is an open compartment where the pregnant ewes are taken only at the exact time of delivery. There are 300 sheep of “Turcana” species sheltered in that sheepfold. These are permanently sheltered in the paddock, whose dimensions are 20m x 15m, allowing 1m² for each sheep. The temperatures in the sheepfolds are shown in Table 2. fig. 1. The average temperatures calculated for each analyzed sheepfold show:

- the temperature varies between 7.6⁰C and 15.9⁰C in the closed sheepfold,
- the temperature varies between 2.9⁰C and 10.2⁰C in the open sheepfold.

Comparison of the climatologic data pertaining the region (Table 3, fig. 2) and our recorded data reflects the difference between temperatures inside and outside of the shelters. The difference between internal and external temperatures at the sheepfolds Nos. 3 and 4 was less than 6⁰C, which was caused by an insufficient thermal insulation of the surrounding walls. In the closed sheepfolds, the speed of the air draft does not exceed 0.35m/s when the doors are closed and may reach values close to 0.5m/s when the doors are open. (Table 1)

Table 1

Air draft speed (m/s) inside the shelter, during the 2011/2012 period

Month	Sheepfold No.1 Semi-open	Sheepfold No.2 Semi-open	Sheepfold No.3 Closed	Sheepfold No. 4 Closed
November	0.84	0.89	0.28	0.29
December	1.12	1.04	0.35	0.31
January	0.80	0.82	0.25	0.26
February	0.60	0.75	0.23	0.21
March	0.46	0.48	0.26	0.22

Table 2

Temperature readings ($^{\circ}\text{C}$) inside the shelters, during the 2011/2012 period

Month	Ten day period	Sheepfold No.1 Semi-open	Sheepfold No.2 Semi-open	Sheepfold No.3 Closed	Sheepfold No. 4 Closed	Sheepfold No. 5 closed+ room calving
November	I	5,2	4,9	5,4	8,9	8,2
	II	12,9	12,6	13,0	15,1	15,9
	III	10,1	8,7	9,3	12,9	13,8
	media	9,4	3,73	9,23	12,3	12,6
December	I	4,9	5,2	5,8	9,2	8,9
	II	-1,3	-1,9	-1,6	4,1	3,9
	III	-1,0	-1,7	0,9	5,1	4,5
	media	1,8	1,7	1,7	5,1	5,7
January	I	-1,6	-1,9	-1,0	4,8	4,1
	II	-4,5	-3,9	-5,2	2,9	2,1
	III	1,8	2,0	2,2	6,7	5,9
	media	1,4	-1,2	-1,3	4,8	4,0
February	I	-3,9	-3,5	-3,8	1,6	1,8
	II	-6,5	-5,9	-6,2	-1,5	-1,2
	III	-4,7	-4,2	-4,8	1,2	1,0
	media	-5,0	-4,5	-4,9	-0,3	0,5
March	I	1,8	2,1	2,5	6,8	6,1
	II	5,1	5,7	5,9	10,1	9,2
	III	7,7	7,8	8,0	11,4	11,9
	media	4,8	5,2	5,4	9,4	9,0

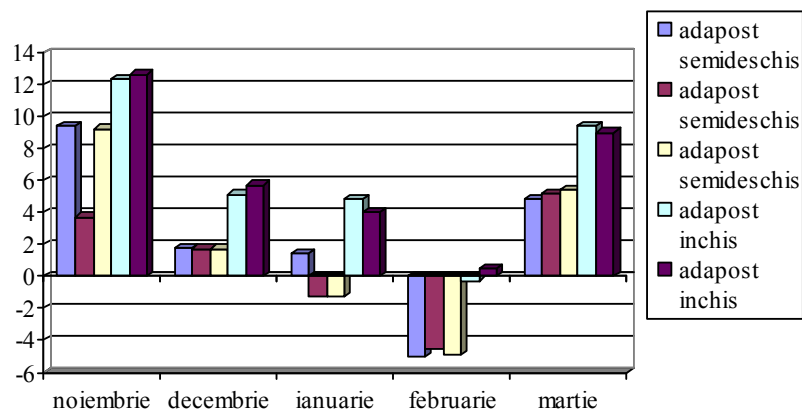


Fig. 1. The evolution of temperature [$^{\circ}\text{C}$] in the shelter during 2011/2012

Table 3

Climatologic data pertaining the analyzed region for the sheltering period 2011/2012

Month	Ten day period	Average temperature [°C]	Rainfall [mm]	Average relative humidity [%]
November	I	4,1	41,3	89
	II	11,6	8,2	71
	III	7,9	2,5	83
	Media	7,8	52,0	81
December	I	4,0	23,3	85
	II	-2,5	5,1	84
	III	-2,1	33,9	88
	Media	-0,3	62,3	86
January	I	-2,4	52,1	89
	II	-5,7	1,2	89
	III	+0,9	8,2	94
	Media	-2,9	61,5	91
February	I	-4,8	50,0	86
	II	-7,3	0,8	82
	III	-5,8	-	83
	Media	-6,0	50,8	84
March	I	0,9	3,2	84
	II	4,0	2,8	74
	III	6,2	5,9	54
	Media	3,8	11,9	70

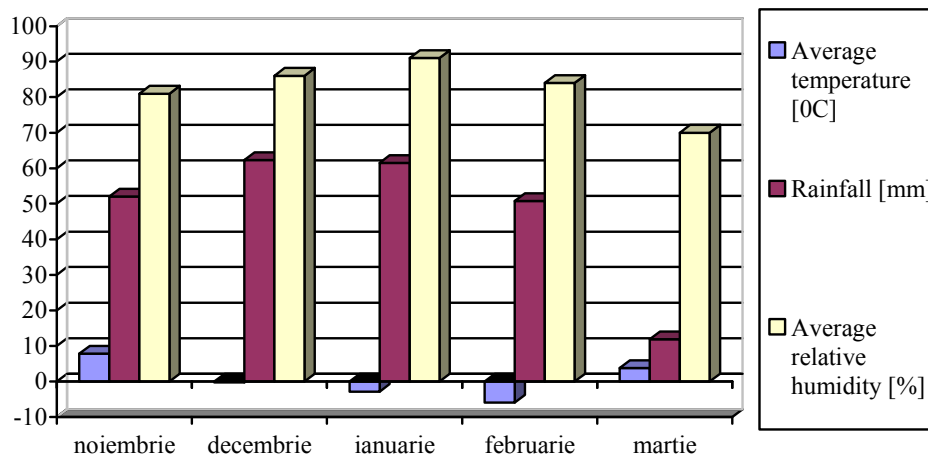


Fig. 2 The evolution of the atmospheric air's temperature, rainfall, humidity during the stabulation period 2002/2003

CONCLUSIONS

The field findings have revealed the following aspects:

- The analyzed sheepfolds are deficient and do not insure the thermal confort of the sheep during the winter period; however, the thermal requirements are acceptable for the sheepfold No. 4.
- It is recommended that the peripheral closures of the shelter during the winter period be improved and to close the admission opening located at the bottom of the shelter, especially in the areas provided for the ewes who have had delivered.
- The air draft speeds in the closed sheepfolds were within the required limits.
- It is not possible to comply with the microclimate's required conditions in the open sheepfolds.

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