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AUG 77 K KOZLOWSKA, W ROGOWSKA

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BACTERIOLOGICAL EXAMINATIONS OF AIR IN SHEEP FOLDS

K. Kozlowska, W. Rogowska
Wroclaw Institute of Veterinary Hygiene

Relatively few authors have undertaken examinations of bacterial flora in the air of animal habitats. Czajkowski (2), Cena (1), and Majewski (3) published the earliest articles on this subject in Poland. Zdzienicki (8) in his extensive work discusses an apparatus suitable to this type of examinations, gives a series of investigative methods, and defines the influence of bacterial air pollution on the appearance of bacterial diseases among people and experimental animals.

In recent years bacteriological examinations of the air are linking in more and more often on the composition of microclimatic examinations of animal habitats. Majewski (4), Surowiecki (7), and Paradowska (6) confirmed the high degree of bacteriological air pollution in the habitats of various kinds of animals. Both Majewski and Surowiecki have the number of microbes in the air dependent upon the normal production cycle. On the other hand, Paradowska as well as Zdzienicki have the number of microbes in the air dependent on microclimatic conditions--chiefly temperature and humidity. Markow (5) in his examinations proved the close dependence between the number of microbes in the air of the habitats and their sanitary

condition and change of air by ventilation devices.

The purpose of our examinations was to define the degree of bacterial air pollution in sheep folds in differentiating microclimatic conditions. For this purpose, after preliminary microclimatic tests conducted in December of 1974, sheep folds were selected for investigation, which differed in thermo-moisture conditions.

Material and Methods

Bacteriological and microclimatic examinations of the air were performed in February of 1975 in 12 halo type sheep folds, in which merino sheep were kept in deep bedding. Partitions of the various folds (walls, ceiling) are built of materials varying in degree of thermoinsulation. Some have utility attics filled with bedding, which are a good insulating material, while others are covered with roofs filled with inadequate thermal insulation. Only in 3 folds were there working exhaust and ventilating ducts of a gravitational kind, in 5 folds exhaust or ventilating ducts were working, while in 4 folds there were no ventilating devices. The inhabitants of the folds in most cases were the mothers with lambs and the young--folds 3, 4, 5, 7, 8, 10, 11, 12, in folds 1 and 2 there were exclusively wethers, . and in folds 6 and 9 only mothers with lambs. Breeding began in November and l lasted to the end of January.

Air samples were gathered once a week for a period of one month. Dishes were placed in 3 places of the building at a height of 1 m. over the bedding before work was begun in the folds (giving of feed, making bedding). At the same time the fundamental microclimatic parameters (temperature, positive humidity, air velocity) were measured by methods used universally in zoological hygiene.

The microflora in the air was examined at the same time by two methods: 1--Koch's sedimentation method, 2--a filtration method, by using a manual suction pump with a membrane filter and mounting, made according to Zdzienicki's schemat. The sedimentation method depended on leaving in the examined fold an open Petri dish having a diameter of 10 cm. with a constant base (2. 5% multipepton agar) for a period of 30 seconds. After the dishes were transported to the laboratory they were incubated at 37°C for 24 hours. Bacteriological examination of the air by the filtration method depended on allowing 1 liter of air through the "Synthesia" type membrane filter (pore size 0. 6 microns). The filter was sterilized by ultra-violet rays and placed in a sterile head. After examination of the 1 liter of air the filter was removed with sterile tweezers and placed in a Petri dish on a stationary base so that the surface onto which the microbes escaped would be directed toward the top (would not directly touch the base). Next, as in the first method, the dishes, together with the

filters, were placed in a thermostat for 24 hours. After the incubation period colonies were counted--for larger numbers of colonies they were counted by using Chiran's micro-adder. In both methods on the basis of the appearance of the colonies and the preparations colored by the Gram method the morphological composition of bacterial flora was defined.

In these folds mentioned from November, 1974 to April, 1975 an analysis was conducted of the sicknesses and fatalities of the sheep against a background of diseases of the respiratory system. Going by the entries made in the books kept on treating the animals by area veterinarians, it was confirmed that the diseases analised were diagnosed as acute pneumonia and chronic pneumonia.

Discussion of Results

During the examination period the differences in temperature and absolute humidity between individual folds were very great (the greatest difference being 12.2°C and 6.15 g/m^3). These differences are connected with the different thermo-insulation value of the constructional partitions of the buildings. On the other hand, the temperature values of consecutive tests in these same folds were sufficiently stable--fluctuations to the order of 0.5 to 1.5°C. Values of absolute humidity also did not show

TABLE 1

Fold No.	No. colonies on dish	No. colonies for 1 l. air	Temp. in °C	Absolute humidity in g/m³	Air velocity in m/sec.	Ventilation 1	Ventilation 2
1	40	80	3,4	4,26	0,276	-	-
2	100	150	7,0	7,09	0,331	-	-
3	80	130	6,0	6,70	0,203	+	+
4	80	130	6,2	6,69	0,181	+	+
5	150	185	9,2	8,20	0,181	+	+
6	170	210	9,6	8,61	0,076	+	+
7	190	260	10,0	8,03	0,141	+	-
8	210	280	10,4	8,80	0,181	+	-
9	205	310	10,8	9,09	0,106	-	+
10	200	295	11,0	8,84	0,080	+	-
11	220	400	12,4	9,25	0,080	-	-
12	235	410	13,6	10,41	0,090	-	-

Explanation: 1 = ventilating exhaust ducts; 2 = gravitational ventilating ducts; + = confirmed; - = not confirmed.

great differences--fluctuations within the limits of 0.2 to 0.8 g/m^3. Air velocity in the folds ran within limits of admissable norms and did not exert greater influence on the number of microbes.

The folds were aligned according to increased air temperature. In connection with insignificant differences of the results obtained from the fourfold tests the values of measured parameters were averaged and presented in Table 1. The graphic presentation of such aligned results

_____ air temp. in ^{o}C

_ . _ . _ , absolute humidity in g/m^3

---------- air velocity in m/sec.

_ _ _ _ no. of microbes on dish

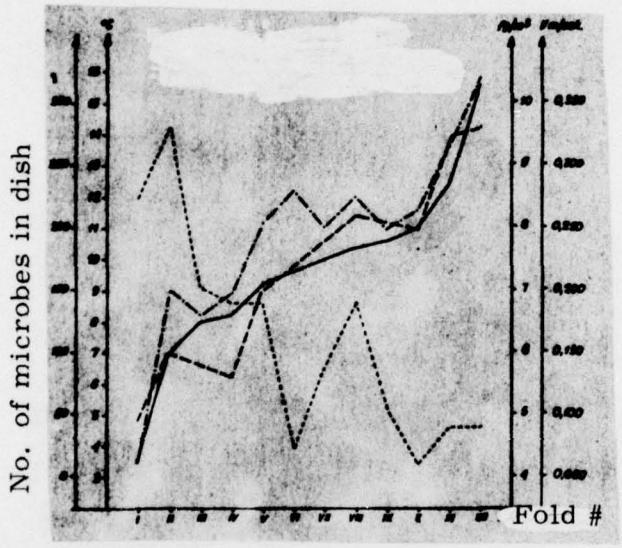

Fig. 1. Microflora in air (sedimentation method) in individual folds, against a background of microclimatic conditions.

(Fig. 1) suggests that there exists a relationship between the number of microbes in the air and the values of the basic microclimatic parameters: temperature and absolute humidity--together with the increase of temperature and humidity the number of microbes increases.

In each fold 12 results of bacteriological tests using the sedimentation method were attained and the same number of results was

achieved by the filtration method. The differences in the number of microbes confirmed by both methods during consecutive tests in the same fold were not great, from 2 to 9 microbes, however, the differences between individual folds were considerable.

The average number of microbes obtained during this examination period using the sedimentation method runs within limits of from 48 to 235 on one dish, while the average number of microbes obtained in this period by the filtration method is higher and is held within limits of 80 to 410 in 1 liter of air. A similar course of curves is observed, representing the number of microbes obtained by the first and second methods (Fig. 2).

Air change without a doubt influences the number of microbes. In folds equipped with working ventilating systems (exhaust and gravitational ducts) the number of microbes in the air is lower in comparison with the number obtained in folds with approximate thermo-moisture conditions not having ventilating systems.

The morphological composition of bacterial flora in the air of the examined folds is presented by the following: Gram + granulations: 67-76%, oxygen-free bacilli: 13-34%, mold: 4-9%.

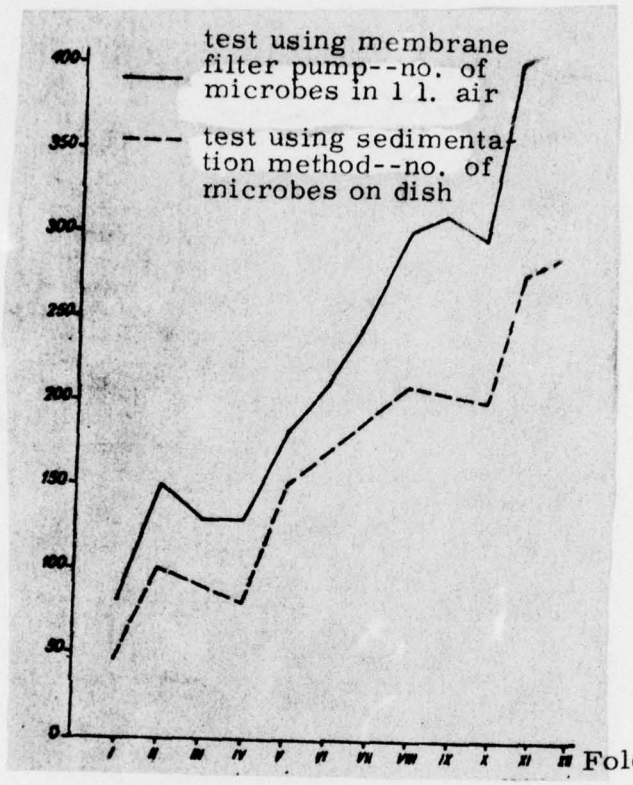

Fig. 2. Number of microbes in air of individual folds from I to XII

On the basis of the book on treating the animals it was confirmed that the most sicknesses and fatalities in the sheep were against a background of diseases of the respiratory system in folds having the highest humidity and the greatest number of microbes in the air. The index of morbidity and fatalities in all the folds is considerably higher among lambs than the number of adult and young sheep. Detail information concerning the numbers of sick and fallen sheep is presented in Table 2.

Tab. 2.

	Adult and young sheep					Lambs				
Fold #	No. head	No. sick	%	No. dead	%	No. head	No. sick	%	No. dead	%
1	302	2	0,66	-	-	-	-	-	-	-
2	361	3	0,83	-	-	-	-	-	-	-
3	338	2	0,59	-	-	250	3	1,20	-	-
4	389	1	0,25	-	-	284	2	0,70	-	-
5	333	2	0,60	1	0,30	239	9	3,76	5	2,09
6	322	4	1,24	-	-	341	15	4,39	-	-
7	320	9	2,80	1	0,25	345	11	4,47	7	2,84
8	357	11	2,99	-	-	273	12	4,39	9	3,29
9	380	13	3,42	7	1,84	292	17	4,33	14	3,57
10	416	-	-	-	-	347	20	8,09	7	2,83
11	412	14	3,39	5	1,21	298	16	5,36	10	3,35
12	294	9	3,06	3	1,02	253	21	8,62	10	3,92

Conclusions

1. The difference in the number of microbes in the air between examined folds amounts to from several tens to several hundred both by using the first and second method.

2. The number of microbes in the air of the folds increases in parallel to the increase in temperature and relative humidity.

3. In folds equipped with working exhaust and gravitational ventilating systems, the number of microbes in the air is somewhat lower in comparison with folds having approximate microclimatic conditions, not having ventilating systems.

4. In folds with optimal air temperature, high humidity and large number of microbes, the index of morbidity and fatalities in sheep is considerably higher than in folds with lower temperature and humidity as well as a smaller number of microbes.

BIBLIOGRAPHY

1. *Cena M., Janowski T., Olpińska K., Słomka J.*: Zesz. Nauk. WSR Wrocław, Zootechnika 2, 191, 1956.
2. *Czajkowski Z., Ugorski L.*: Medycyna Wet. 10, 330, 1954.
3. *Majewski T.*: Roczn. Nauk Roln. 89, 253, 1966.
4. *Majewski T., Rączkiewicz J., Obal H.*: Medycyna Wet. 29, 161, 1973.
5. *Markow J. M., Czernyj N. W., Wowk A. S., Lewanidowa Z. G., Duszko N. I., Bilczenko W. I., Kuźmin S. P., Kosienko L. A.*: Wietierinarija 6, 27, 1973.
6. *Paradowska E.*: Badania nad mikroflorą powietrza pomieszczeń dla zwierząt i próby określenia jej zależności od niektórych czynników środowiska powietrznego. Praca doktorska. WSR Kraków 1972.
7. *Surowiecki K., Karczewski W.*: Medycyna Wet. 29, 248, 1973.
8. *Zdzienicki S.*: Aerosole biologiczne w zarysie. PZWL 1969.

Adres autora: dr Karolina Kozłowska, ul. Kom. Paryskiej 9/14, 50-451 Wrocław.

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