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THE INFLUENCE OF ZOOHYGIENIC CONDITIONS ON FERTILITY AND FUR QUALITY OF FARMED CHINCHILLAS

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The aim of this study was to investigate the impact of zoohygienic conditions on selected production indicators of chinchillas, including fertility and fur quality. The research was conducted on a chinchilla farm in Myślenice (Poland), analyzing two housing units (Room A and Room B) during two periods: winter and spring. Measurements included temperature, humidity, air movement, gas concentration, and lighting within cages located at different levels. The results indicate that temperature and humidity were critical factors influencing productivity and fur quality. During the winter, lower fertility and poorer fur quality were observed, particularly in the colder housing unit B, where the average temperature was 17°C. Humidity levels in winter were also low (19–37%), negatively affecting health and fur quality. Spring conditions were more favorable, with higher temperatures (18.6°C in housing unit A) and humidity levels, leading to improved production indicators. Lighting, especially on the upper cage levels, also positively affected fertility. Higher light intensity in housing unit A contributed to better reproductive outcomes. In summary, optimizing the microclimate in farm housing, particularly with regard to temperature, humidity, and lighting, is crucial for enhancing production efficiency on chinchilla farms.

Keywords: *chinchillas, zoohygienic conditions, microclimate, fertility, fur quality*

Relevance. Populations of wild short-tailed chinchillas (*Chinchilla lanigera*) once inhabited the arid mountainous regions of the Andes in Chile, Bolivia, Peru, and Argentina [1, 2, 3]. Their typical habitat consists of rocky or sandy terrain with sparse vegetation, including thorny shrubs, cacti, and bromeliads. Chinchillas are nocturnal animals and rarely leave their shelters before sunset [4]. They usually seek refuge in rock crevices, burrow under rocks, or hide in large bromeliads to protect themselves from predators such as wild canids, felids, and occasionally hawks and owls [5].

Chinchillas range in size from 22.5 to 38 cm (±7.5 cm, including the tail) [6], with relatively long whiskers (9.2–13.2 cm) [7]. Females are heavier than males, weighing around 800 g compared to 500 g. Chinchilla fur is extremely dense, with up to 60 hairs per follicle [6]. While their natural wild color is bluish-gray, the most common coloration in farmed chinchillas is dark blue-gray [8].

Wild chinchillas were commercially hunted for their valuable pelts, leading to their near extinction by the late 19th century [9]. Modern farmed chinchillas are descended from 12 wild Chilean chinchillas captured in 1923 by Matthew Chapman [10]. Farmed chinchillas are typically housed in polygamous cage systems, with 4–6 females per male. Each female is kept in a separate cage, while males have access to a corridor connecting the females' cages. Females wear collars to prevent them from leaving their cages. Chinchillas are fed a commercial complete pelleted diet, hay, and have access to dust baths [11]. On most European chinchilla farms, cage dimensions are approximately 0.4–0.5 m in length, 0.5 m in width, and 0.34–0.4 m in height. However, according to EU recommendations, cages should be 0.5 m deep, 1.0 m wide, and 1.0 m high [12, 13].

Chinchillas give birth after a gestation period of approximately 111 days, with newborns weighing 30 to 110 g, depending on litter size. Typically, litters consist of two or three pups. Studies by Barabasz and Łapiński [14] on the growth of young chinchillas have shown that the lactation performance of females is strongly correlated with the number of pups in a litter, with smaller litters producing offspring with higher body weights compared to larger litters. These findings suggest that managing breeding conditions, including litter size and access to maternal milk, can affect the development and health of young animals, indirectly influencing fur quality.

While much of the existing research emphasizes welfare protocols for farm animals broadly, studies specific to the environmental and behavioral needs of chinchillas remain limited. This study addresses this gap by evaluating how specific microclimatic conditions influence key production outcomes. Also the fur chewing, a common issue in chinchilla farming, is linked to stress, often exacerbated by inappropriate housing conditions. This can lead to heat loss, increased feed and water consumption, and compromised welfare [15, 16].

In the wild, chinchillas sleep in shaded or concealed areas during the day and are active at dusk and night when temperatures are cooler. Their dense fur provides insulation against the harsh climate of their high-altitude habitats. In farm environments, chinchillas require appropriate lighting conditions and stable microclimatic parameters. Farm productivity is heavily dependent on proper management of zoohygienic conditions. Microclimatic factors such as temperature, humidity, air movement, lighting, and gas concentrations directly affect the welfare and productivity of animals. Modern farms strive to adapt housing technologies to the specific needs of each species, ensuring that climatic conditions in livestock facilities provide animals with comfort conducive to both fertility and fur quality [17, 18].

Despite technological advancements, significant challenges remain in optimizing microclimatic conditions on chinchilla farms. The lack of precisely established microclimatic standards for this species often forces farmers to individually adjust housing conditions, frequently resulting in inefficiencies and economic losses. According to the literature, inadequate microclimatic conditions can negatively impact animal fertility and fur quality, directly affecting farm profitability [19].

Purpose of work. The aim of this study was to evaluate the influence of zoohygienic conditions, including temperature, humidity, and other environmental factors, on the fertility and fur quality of chinchillas raised under farm conditions. The analysis covered two periods, winter and spring, to determine how changing climatic conditions might affect the production performance of chinchillas.

Materials and methods. The study was conducted at the "Raba" Chinchilla Breeding Farm in Myślenice, Poland. The farm is housed in a two-story building. Two rooms (A and B) with different sizes and ventilation systems were analyzed.

- Room A (second floor) has a volume of 214 m^3 and houses 535 chinchillas, providing 0.40 m^3 per animal. It features eight windows for natural light, supplemented by 15 fluorescent lamps and two incandescent lamps. Ventilation is provided by a mechanical fan. The cages are arranged in five levels, with 18 cages per row.
- Room B (first floor) is larger, with a volume of 404 m^3 and an occupancy of 720 animals (0.56 m^3 per animal). It has double windows for natural lighting and is equipped with 21 fluorescent lamps. Ventilation is mechanically supported by four fans. The cages are similarly arranged in five levels, with 18 cages per row.

The cages, made from galvanized mesh, have a universal design with a removable manure tray. Each cage includes a drawer for bathing dust, an automatic waterer, and a self-feeding trough. In the polygamous system, one male is paired with six females. The young are raised on trays filled with wood shavings, which are regularly replaced to maintain hygienic conditions.

The animals were fed commercial complete pelleted feed, along with hay, water, mineral blocks, and chewing stones for dental health.

Research Methods

Zoohygienic instrumental studies were conducted in two stages: winter (I) and spring (II). Each stage lasted two days, with measurements taken inside the chinchilla rooms and outside the building. The studies covered basic microclimatic parameters: lighting, humidity, vapor pressure, air movement, temperature, cooling, concentrations of carbon dioxide (CO_2), hydrogen sulfide (H_2S), ammonia (NH_3), and ozone (O_3). Measurements were taken twice daily—morning (7:30) and early afternoon (13:00) —both inside the rooms and outside, at a distance of 10 meters from the building.

Inside the rooms, measurements were conducted at three cage levels (I – topmost, II – middle, III – lowest) at fixed 27 measurement points. On the first day, morning measurements were taken in Room A and afternoon measurements in Room B; this sequence was reversed on the second day. Additionally, natural lighting was measured at noon with artificial lights turned off.

Instrumentation

Zoohygienic parameters were measured using standard equipment:

1. Katathermometric measurements – A Hill dry katathermometer was used to measure cooling and air movement, with cooling and air velocity calculated.
2. Psychrometric measurements – An Assmann aspiratory psychrometer measured air temperature and humidity, with vapor pressure calculated from psychrometric tables.
3. Luxometric measurements – Brightness inside the rooms was measured with a TES 1335 lux meter, and the brightness coefficient was calculated by comparing indoor and outdoor measurements.
4. Ozonometric measurements – An ozone meter (DP-11OZ) was used to measure ozone concentrations inside and outside the building.
5. Gas concentration measurements – A POLYTECTOR II analyzer measured CO_2, H_2S, and NH_3 concentrations at fixed points inside and outside the rooms.
6. Fur quality assessment – Fur quality was evaluated using the Chinchilla Phenotype Assessment Standard [20] (Table 1, Item 4). Assessments were conducted by an experienced farm employee with appropriate qualifications.
7. Impact of microclimate on fertility – Data on the number of offspring were obtained from farm records to assess the impact of climatic conditions on chinchilla fertility.

Table 1. Scoring criteria for the evaluation of chinchilla phenotypic characteristics (KCHZ 2012)

Trait	Standard Requirements	Minor Faults	Major Faults	Disqualifying Faults
1. Size and Build	4	3	2-1	0
2. Color Type	5	4-2	1	0
3. Purity of Coat Color	9	7	5 or 3	0
4. Coat Quality	9	7 or 5	3 or 1	0
5. Ventral Band	3	2	1	0

All measurements were conducted using standard zoohygienic methods at designated measurement points inside and outside the building. This comprehensive assessment allowed for a thorough evaluation of the impact of the microclimate on the health and productivity of chinchillas.

All experimental procedures were conducted in compliance with relevant ethical guidelines for animal research, with approval from the institutional animal care and use committee.

Research results. Studies conducted during the winter and spring periods revealed clear differences in the microclimatic conditions of the housing facilities and their impact on chinchilla fertility and fur quality. Measurements of parameters such as temperature, humidity, air movement, lighting, and gas concentrations allowed for an assessment of the influence of these factors on the health and productivity of the animals (Table 2, 3).

Microclimatic Conditions

Temperature and Humidity

Air temperature measurements showed differences between Room A (second floor) and Room B (first floor). During the winter period (January–February), the temperature in Room A ranged from 15.2°C to 20.5°C, while in Room B, it was lower, with a minimum of 11.6°C. In the spring period (April–May), the temperature increased, especially in Room A, where the average reached 18.6°C, positively influencing production outcomes.

Relative humidity was low during winter, associated with room heating. In Room A, it ranged from 27% to 37%, while in Room B, it was between 19% and 31%. In the spring, humidity increased to 56%–63% in Room B, improving living conditions for the animals.

Lighting

Natural light intensity in Room A averaged 174 Lx at the upper cage levels, gradually decreasing to 56 Lx at the lower levels. Room B, with a larger window area, exhibited higher natural light intensity, which improved animal comfort. However, insufficient lighting at the lower cage levels may have negatively impacted fertility and fur quality.

Air Movement and Gas Concentrations

The air movement speed in both rooms was relatively low, particularly during winter, which contributed to the accumulation of carbon dioxide (CO_2) and ammonia (NH_3). Gas measurements revealed trace amounts of NH_3 and no detectable hydrogen sulfide (H_2S) in the farm's air. CO_2 concentrations during winter averaged 1,039 ppm in Room A and 742 ppm in Room B, which were within acceptable limits. However, prolonged exposure to higher concentrations could reduce animal comfort and affect their health. In the spring period, gas concentrations were lower due to improved ventilation and higher outdoor temperatures.

Table 2. Average values of microclimatic parameters in chinchilla housing rooms and outdoors during stage I of the study (winter)

Parameters	Room A			Room B			Outdoors		
	min.	$\overline{X}$	max.	min.	$\overline{X}$	max.	min.	$\overline{X}$	max.
Temperature (°C)	15,2	18,0	20,5	11,6	17,0	21,6	-14,4	-8,4	-3,8
Relative Humidity (%)	27	31	37	19	25	31	71	75	81
Air Movement (m/s)	0,022	0,082	0,226	0,040	0,131	0,723	0,226	0,857	1,98
Cooling (mW/cm²)	18,05	24,46	34,63	19,06	27,64	49,91	70,71	106,0	169,7
Vapor Pressure (mmHg)	3,6	4,8	6,4	2,1	3,7	5,6	1,1	1,9	2,6
Lighting (Lx)	39	123	340	9	137	308	248	7653	19043
CO_2 Concentration (ppm)	750	1039	1600	650	742	900	300	305	400
O_3 Concentration (ppb)	39	42	45	39	42	45	27	48	75

Table 3. Average values of microclimatic parameters in chinchilla housing rooms and outdoors during stage II of the study (spring)

Parameters	Room A			Room B			Outdoors		
	min.	$\overline{X}$	max.	Parameters	min.	$\overline{X}$	max.	Parameters	min.
Temperature (°C)	17,8	18,6	20,0	14,4	16,8	18,6	7,0	11,8	20,4
Relative Humidity (%)	51	57	63	52	58	66	33	78	95
Air Movement (m/s)	0,030	0,068	0,160	0,022	0,081	0,181	0,303	0,463	0,723
Cooling (mW/cm²)	20,95	23,10	27,37	22,93	26,14	33,94	33,27	48,51	60,61
Vapor Pressure (mmHg)	7,9	9,3	10,6	7,8	8,4	9,1	5,8	7,4	8,4
Lighting (Lx)	33	108	389	14	125	365	1585	12505	43883
CO_2 Concentration (ppm)	500	639	850	350	535	850	300	300	300
O_3 Concentration (ppb)	39	42	45	39	42	45	30	52	63

Production Indicators

Fertility

The results on fertility indicated that microclimatic conditions had a significant impact on litter size. In Room A, where thermal conditions were more stable, fertility was higher compared to Room B (Table 4).

Table 4. Average fertility of chinchillas in rooms A and B

Room	A								
Cage level	I			II			III		
Values	min.	$\overline{X}$	max.	min.	$\overline{X}$	max.	min.	$\overline{X}$	max.
Fertility	1,0	1,69	3,0	1,0	1,47	2,3	1,0	1,76	2,5
Room	B								
Cage level	I			II			III		
Values	min.	$\overline{X}$	max.	min.	$\overline{X}$	max.	min.	$\overline{X}$	max.
Fertility	1,0	1,97	3,0	1,0	1,86	3,0	1,0	1,89	3,0

Fur Quality

Fur quality was assessed based on the density, length, silkiness, and elasticity of the hair, following the Chinchilla Phenotype Assessment Standard [20]. During the winter study period, poorer fur quality was observed, particularly in Room B, where lower temperatures and humidity negatively impacted the condition of the skin and the animals' coat. In spring, as microclimatic conditions improved—especially in Room A—a significant improvement in fur quality was noted. The hair was denser, silkier, and more elastic, indicating better living conditions for the animals.

Impact of Cage Levels on Production Indicators

The study revealed that production indicators varied depending on cage level. Animals housed on the upper levels, where temperature and lighting were better, demonstrated higher fertility (Table 5) and better coat quality: Level I – 7.7 (SD 1.4), Level II – 6.8 (SD 1.2), Level III – 5.4 (SD 0.9). The results of coat quality assessments between Level I and Level III were statistically significant ($p<0.01$). On the lower levels, where conditions were less favorable (lower lighting and higher gas concentrations), production outcomes were poorer.

Table 5. Average fertility of chinchillas by cage level and light intensity

Room	A						B					
Stage	I - Winter			II - Spring			I - Winter			II - Spring		
Cage level	I	II	III	I	II	III	I	II	III	I	II	III
Lightning (Lx)	144	126	98	137	110	77	185	148	77	175	126	73
Fertility	1,69	1,47	1,76	1,69	1,47	1,76	1,97	1,86	1,89	1,97	1,86	1,89

Discussion. Creating optimal housing conditions for chinchillas, as with any fur animal, requires consideration of multiple factors such as microclimate, nutrition, handling, and the organization of the breeding space. In the chinchilla farm facilities analyzed, key factors influencing fertility and fur quality were microclimatic parameters, including temperature, humidity, lighting, and gas concentrations.

According to the literature, the temperature in chinchilla housing should range between 16–22°C [21, 22] to ensure regular births and reduce neonatal mortality. In the present study, the average room temperatures were within the recommended range, confirming that the conditions in the studied facilities did not pose a threat to animal health. Similar findings were reported by Barabasz and Hoefer [18, 23], who highlighted that temperatures between 18–20°C promote animal health and reproduction.

The results also revealed temperature differences across cage levels, which could significantly affect animal health and fur quality. During the winter studies, the temperature difference between the highest and lowest cage levels reached up to 3°C, indicating a potential need for more uniform ventilation within the rooms. Similar conclusions were drawn by Felska [24], who emphasized that maintaining stable temperatures across all cage levels is crucial for chinchilla health and fur quality.

Humidity is another crucial factor influencing animal health and comfort. In the current study, winter humidity levels were low (27–37% in Room A and 19–31% in Room B), which could negatively affect animal health by increasing the risk of skin diseases such as fungal infections and reducing fur elasticity [22]. According to Jarosz and Rżewska [21], optimal relative humidity for chinchillas should be 50–70%, providing adequate protection against overheating and improving fur quality. Low humidity levels during the winter period may have contributed to poorer health outcomes, particularly in the middle sections of the cages, where fungal infections were more frequently observed.

Lighting is another factor influencing fertility and fur quality. The study confirmed that better lighting in Room B, especially at the upper cage levels, positively impacted fertility and fur quality. Neira et al. [25] and Barabasz [18] reported that females housed in well-lit environments produce larger and stronger litters. The current findings indicate that the highest fertility rates and the best-quality fur were observed in areas with the highest light intensity, consistent with the literature.

Gas concentrations, particularly ammonia and carbon dioxide, are critical zoohygienic parameters affecting animal health. Excessive ammonia levels can irritate the respiratory tract and cause coat discoloration [18]. In the current study, ammonia concentrations were minimal, indicating good ventilation and hygiene standards in the rooms.

Conclusions. In summary, the findings confirm that microclimatic conditions, particularly temperature, humidity, lighting, and gas concentrations, significantly influence chinchilla fertility and fur quality. Optimal conditions result in better production outcomes, as supported by both the literature and the present study. To further enhance chinchilla farming efficiency, more precise control of the microclimate, especially regarding humidity and temperature distribution within the rooms, is recommended.

References

1. Spotorno A.E., Zuleta C.A., Valladares J.P., Deane A.L., Jimenez J.E. (2004) Chinchilla laniger in Mammalian species. ASM, 758, 1-9.

2. Valladares P., Zuleta C., Spotorno O.Á. (2014) Chinchilla lanigera (Molina 1782) and C. chinchilla (Lichtenstein 1830): review of their distribution and new findings. https://repositorio.uchile.cl/handle/2250/147330

3. Roach N., Kennerley R. (2016) Chinchilla lanigera (errata version published in 2017). The IUCN Red List of Threatened Species 2016, e.T4652A117975205. https://dx.doi.org/10.2305/IUCN.UK.2016-2.RLTS.T4652A22190974.en

4. Bidlingmaier T.C. (1937) Notes on the genus Chinchilla. J. Mammal. 18, 159-163. https://doi.org/10.2307/1374461

5. Valladares F.P, Spotorno O.Á, Zuleta R.C. (2014) Natural history of the Chinchilla genus (Bennett 1829): Considerations of their ecology, taxonomy and conservation status. Gayana (Concepción). 78, 135-143. https://doi.org/10.4067/S0717-65382014000200008

6. SCAHAW. (2001) Scientific Committe on Animal Health and Animal Welfare, 2001. The Welfare of Animals Kept for Fur Production. European Commission. https://food.ec.europa.eu/system/files/2020-12/sci-com_scah_out67_en.pdf

7. Chernova O.F., Zherebtsova O.V. (2023) Architecture of vibrissae in eight rodent species of Ctenohystrica (Rodentia): A comparative SEM study. Zoologischer Anzeiger; 307, 54-69. https://doi.org/10.1016/j.jcz.2023.09.004

8. Mans C., Donnelly T.M. (2021) Chapter 22: Chinchillas. In: 4th. Ferrets, rabbits, and rodents: Clinical medicine and surgery. Elsevier. St. Louis, Missouri. 298-322.

9. Jiménez, J.E. (1996) The extirpation and current status of wild chinchillas Chinchilla lanigera and C. brevicaudata. Biol. Conserv., 77, 1-6. https://doi.org/10.1016/0006-3207 (95) 00116-6

10. Parker, W.D. (1975) Modern chinchilla farming. Borden Publishing Co., Alhambra, California.

11. Dzierżanowska-Góryń, D.; Kaleta, T.; Kowalczyk, M. (2005) The behaviour and an activity of chinchilla (Chinchilla lanigera) kept under laboratory conditions. In XIIth International Congress in Animal Hygiene (ISAH), Warszawa, Poland, Warsaw Agricultural University. https://www.isah-soc.org/userfiles/downloads/proceedings/2005/sections/109_vol_2.pdf

12. Łapiński, S.; Niedbała, P.; Markowska, K.; Rutkowska, A.; Lis, M.W. (2023) The effects of age, size, and cage complexity on the behaviour of farmed female chinchillas (Chinchilla lanigera). Sci. Rep., 13, 6108. https://doi.org/10.1038/s41598-023-32516-5

13. CoE. (1999) Standing Committee of the European Convention for the Protection of Animals Kept for Farming Purposes (T-AP). Recommendation Concerning Fur Animals, Adopted by the Standing Committee on 22 June 1999. https://www.coe.int/t/e/legal_affairs/legal_co-operation/biological_safety_and_use_of_animals/farming/rec%20fur%20animals%20e%201999.asp

14. Barabasz B., Łapiński S. (2008) Growth rate of sucking chinchilla pups and lactating performance of their dams. Animal Science Papers and Reports, 3, 227-234.

15. Łapiński, S.; Lis, M.W.; Wójcik, A.; Migdał, Ł; Guja, I. (2014) Analysis of factors increasing the probability of fur chewing in chinchilla (Chinchilla lanigera) raised under farm conditions. Ann. Anim. Sci., 14, 189–195. https://doi.org/10.2478/aoas-2013-0067

16. Łapiński, S.; Orel, J.; Niedbała, P.; Kucharska, W.; Jakubowska, M.; Lisowska-Lis, A.; Tombarkiewicz, B.; Lis, M.W. (2020) Infrared Thermography as an Indicator of Heat Loss in Fur-Chewing Chinchillas (Chinchilla lanigera). J. Appl. Anim. Welf. Sci., 23, 338-347. https://doi.org/10.1080/10888705.2019.1614924

17. Sulik M., Seremak B., Bielińska A., Mieleńczuk G. (2001) Intensywność użytkowania rozpłodowego samic szynszyli w wybranej fermie na Pomorzu Zachodnim. Zeszyty Naukowe Polskie Towarzystwo Zootechniczne Warszawa, 58, 73-78.

18. Barabasz B. (2008) Szynszyle Chów fermowy. PWRiL, Warszawa.

19. Sulik M., Felska L. (2000) Analiza wad skór szynszylowych. Zeszyty Naukowe Polskie Towarzystwo Zootechniczne Warszawa, 53, 205-214.

20. KCHZ. (2012) Wzorzec oceny fenotypu szynszyli. Krajowe Centrum Hodowli Zwierząt, Warszawa.

21. Jarosz S., Rżewska E. (1996) Szynszyle, chów i hodowla. Państwowe Wydawnictwo Rolnicze i Leśne, Warszawa.

22. Nowak M. (1995) Jak urządzić fermę szynszyli. Biuletyn Informacyjny dla Hodowców Szynszyli, 1.

23. Hoefer H.L. (1994) Chinchillas. Veterinary Clinics of North America: Small Animal Practice. 24, 103-111. https://doi.org/10.1016/S0195-5616_(94) 50005-6

24. Felska L. (19990 Warunki zoohigieniczne na fermie szynszyli. Przegląd Hodowlany, 7, 24-26.

25. Neira N.R., Garcia F.X., Scheu R. (1989) Analisis descriptivo del comportamiento reproductivo y de crecimiento de chinchillas (Chinchilla laniger Grey) en confinamiento. Avances en Produccion Animal, 14, 109-119.

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ВПЛИВ ЗООГІГІЄНІЧНИХ УМОВ НА ПЛОДЮЧІСТЬ ТА ЯКІСТЬ ХУТРА ФЕРМЕРСЬКИХ ШИНШИЛ

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Метою цього дослідження було дослідити вплив зоогігієнічних умов на окремі продуктивні показники шиншил, включаючи плодючість та якість хутра. Дослідження проводили на фермі шиншил у Мисленіце (Польща), аналізуючи дві житлові одиниці (кімнату А та кімнату Б) протягом двох періодів: зими та весни. Вимірювали температуру, вологість, рух повітря, концентрацію газу та освітлення в клітках, розташованих на різних рівнях. Результати показують, що температура і вологість були критичними факторами, що впливають на продуктивність і якість хутра. Взимку спостерігалася нижча плодючість і нижча якість хутра, особливо в більш холодному житловому приміщенні B, де середня температура становила 17°C. Рівень вологості взимку також був низьким (19–37%), що негативно впливало на здоров'я та якість хутра. Весняні умови були більш сприятливими, з вищими температурами (18,6°C у житловому приміщенні A) та рівнями вологості, що призвело до покращення показників продуктивності. Освітлення, особливо на верхніх рівнях клітки, також позитивно вплинуло на плодючість. Вища інтенсивність світла в житловій одиниці A сприяла кращим репродуктивним результатам. Таким чином, оптимізація мікроклімату у фермерських приміщеннях, особливо щодо температури, вологості та освітлення, має вирішальне значення для підвищення ефективності виробництва на фермах шиншил.

Ключові слова: *шиншили, зоогігієнічні умови, мікроклімат, плодючість, хутро, якість*