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SEROLOGICAL MONITORING OF BACTERIAL ZOONOTIC PATHOGENS IN KHARKIV REGION (UKRAINE) FOR 2011–2024

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Abstract*. The aim of study was to determine the spread of bacterial zoonoses on livestock farms and in the private sector of the Kharkiv region (Ukraine) based on the results of serological monitoring. The study was conducted at the Kharkiv Regional State Laboratory of the State Service of Ukraine for Food Safety and Consumer Protection, covering the period 2011-2024 using methods of retrospective, statistical, structural and epizootic analysis. The results obtained allowed us to assess the infection of the livestock with bacteriosis and install the intensity of the epizootic process in the Kharkiv region with regard to bacterial infections among animals based on the results of the study of the sample 3461694 blood sera from animals of various species. According to the results of the research, antibodies to the causative agents of leptospirosis, brucellosis, infectious epididymitis of sheep, and chlamydia were detected in 75,251 animals. The results obtained allowed us to assess the infection of the livestock which it possible to establish the intensity of the epizootic process in the Kharkiv region with regard to bacterial infections among animals. Military operations in the region, which were launched by Russia, do not allow for the full implementation of appropriate veterinary and sanitary measures to limit the circulation of relevant pathogens. The results obtained justify proves the need to continue regular serological monitoring of diseases of bacterial aetiology in order to maintain public and timely prevention of zoonotic diseases.*

Keywords: bacterial zoonoses, serological tests, leptospirosis, brucellosis, chlamydiosis.

Introduction. Food safety is the basic criterion for the effectiveness of the state strategy for high-quality food supply. The policy of ensuring biological, chemical, and physical safety is an important component of the EU and in Ukraine policy in the field of ecology, health protection, and consumer rights protection. The quality and safety of food products are among the main factors of national food security in Ukraine (Kotelevich, 2023).

Failure to comply with the requirements of Council Directive 96/23/EEC of April 29, 1996 on measures to control certain substances and their residual content in live livestock and products of animal origin will lead to failure to meet one of the conditions for the entry of Ukrainian products into the international market, including the European Union (Ushkalov, 2023).

Kharkiv region ranks 4th in terms of area (31,418 km²) and 5% of the total area of Ukraine. The livestock population as of 01.04.2024, according to statistical reports of the Main Department of the State Service of Ukraine for Food Safety and Consumer Protection in Kharkiv region, is: cattle 559,467 heads (in farms), 20,503 heads (in the private sector); small cattle 5,087 heads (in farms), 13,132 heads (in the private sector); pigs 52,353 heads (in farms), 1,978 heads (in the private sector); poultry 1,208,500 heads (in farms), 750,708 heads (in the private sector); horses 450 heads (in farms), 301 (in the private sector).

An important link in supporting the epizootic well-being of the country is the timely diagnosis of an infectious animal disease. In today's conditions and increased requirements for biosafety, the importance of timely and high-quality laboratory tests is increasing. For most infectious diseases, only a laboratory-confirmed diagnosis is final.

In order to timely detect bacterial zoonoses such as leptospirosis, brucellosis, infectious epididymitis of sheep, chlamydia, listeriosis, anthrax (in raw hides) and glanders, state laboratories of the State Service for Food Safety and Consumer Protection, in accordance with current requirements (Law of Ukraine «On Veterinary Medicine», 2025), conduct serological laboratory diagnostic studies of biological material from animals (animal blood serum).

In Ukraine, under the influence of external negative factors (russian military aggression and the risks of agroterrorism), maintaining epizootic well-being becomes an extremely important factor for ensuring food safety, animal health and well-being, which is achieved by performing scheduled laboratory diagnostic studies of biological material from farm animals in state laboratories of the State Service for Food Safety and Consumer Protection within the framework of nationwide programs in the field of food safety and veterinary medicine.

A number of zoonotic infections of bacterial etiology remain relevant for Ukraine. In particular, anthrax, leptospirosis, brucellosis, chlamydia, listeriosis, etc. (Ushkalov, 2017; Karchevska, 2021).

Leptospirosis of animals remains a rather urgent problem today and is registered in many regions of Ukraine. Ukraine is characterized by an unstable epidemic situation with the activation of natural and anthropogenic foci with rather high mortality rates: on average 9 – 12% and mortality (0.07 – 0.12 per 100 thousand population). The incidence of leptospirosis is recorded sporadically in all regions (Melnyk, 2019; 2021).

According to WHO, about 500 thousand new cases of human brucellosis are registered in the world annually. The socio-medical problem of brucellosis is determined by the peculiarities of the clinical course of this infection with the frequent development of chronic recurrent forms and disability (Chemych, 2017).

Isolated cases of this infection among people are registered in Ukraine almost annually, despite the complete elimination of brucellosis diseases among farm animals (sheep - in 1967; cattle - in 1984; pigs - in 1992) (Novokhatniy, 2017). Thus, in 2021, 2 cases were registered; in 2022 – 1 case. In October 2023, two laboratory-confirmed, unrelated cases of brucellosis in two patients were registered at the Khmelnytsky Infectious Diseases Hospital. The epidemiological history established the use of meat products, including dried meat and cheeses (Official website of the Khmelnytskyi Infectious Diseases Hospital of the Khmelnytskyi City Council, 2023).

Despite the fact that Ukraine is officially considered free from this bacterial zoonosis in farm animals, the situation with brucellosis in the wild fauna of our country remains poorly understood. Results studies of 548 samples of blood serum from wild pigs from 16 regions of Ukraine in 2019 – 2020 indicate circulation *Brucella spp*. from wild pigs: antibody detected in 57 samples (10.4%) detected by complement fixation test, by ELISA – in 83 samples (15.1%). Taking into account cross-reactions with *Yersinia enterocolitica*, the seroprevalence was 7.5% of the total number of samples tested (Alekseeva, 2021).

Studies of animals and diagnostic material for infectious epididymitis are carried out by clinical and epizootological examination of sheep, as well as allergic, bacteriological and serological methods of research (Degtyarev, 2012).

Among the numerous infectious pathologies of humans and animals, anthropozoonotic and zoonotic chlamydial infections occupy a large proportion, which are a serious medical and veterinary problem (Ushakov, 2003). The peculiarity of these pathogens is due to a unique (inherent only to them) development cycle, as well as certain properties characteristic of both viruses and bacteria (Milanko, 2011). A complex epizootic situation with cattle chlamydia has developed in the Kharkiv region. In the region's farms, respiratory diseases of mixed viral-bacterial etiology are registered annually in 70–100% of calves (Isakov, 2014).

In Ukraine, listeriosis in animals is the subject of various types of monitoring in veterinary medicine. So, for example, in the study 25070 samples of pathological and biological materials from pigs, cattle and small cattle, fur animals, poultry and feed, during 2018 – 2022, 14 isolates of microorganisms of the genus Listeria were identified (1 isolate from cattle; 4 – from domestic animals; 7 – from poultry; 2 – other) (Pyskun et al., 2023).

There are about 6 thousand soil foci of the anthrax pathogen in Ukraine. According to the Main Department of the State Service for Food Safety and Consumer Protection in the Kharkiv region, as of 01.01.2025, there are 149 operating livestock burial grounds and biometric pits for burying animal corpses, of which 69,8% are burial sites for the corpses of animals deaths from anthrax and this requires special attention from the veterinary service regarding the prevention of this dangerous disease among animals (Iovenko, 2014; Iovenko, 2023).

Ukraine is free from such a dangerous disease as glanders. Growing international ties, exchange of horses, import of breeding animals from and other countries require monitoring this disease (Galatyuk, 2009; Mezhensky, 2013).

So, effective monitoring and control of animal disease is a crucial task for the biosecurity of raw materials and products of animal origin from the perspective of public health.

Given the above, the aim of the work was to determine the prevalence of bacterial zoonoses in animals based on the results of serological monitoring.

The aim of the study. The aim is to determine the spread of bacterial zoonoses on livestock farms and in the private sector of the Kharkiv region (Ukraine) based on the results of serological monitoring.

Materials and methods. The analysis of the results of bacterial monitoring was carried out using statistical information from the State Service of Ukraine for Food Safety and Consumer Protection, data from various reports of the Kharkiv Regional State Laboratory of the State Service of Ukraine for Food Safety and Consumer Protection and its departments in the districts of the Kharkiv region regarding the results of serological studies of biological materials for the period 2011 – 2024. Also, a significant amount of actual material was retrospective data – reports, laboratory research journals, etc.

The research was carried out using the methods of retrospective (determination of changes in the number and results of serological studies performed over the years), statistical (ratio of the number of studied material and positive cases), structural (ratio of animal bacterioses) and epizootic analysis (circulation of animal bacterioses pathogens). Using the method of graphical analysis, such as a trend line, the future trend of changes in the main indicators over time was predicted, based on data from the epizootic survey of the regions of the region (Melnyk, 2023).

Results. The summarized results of leptospirosis studies are presented in Fig. 1. For the specified period, no clear trend in the level of serovalence was identified. The percentage of positive results ranged from 0.5% (2022) to 16.8% (2023). The significant decrease in the number of samples delivered for research in 2022-2024 is due to s due to the fact that a number of farms it was planned to carry out scheduled blood serum sampling were located in occupied areas or recognized as "particularly dangerous areas", and there was no possibility of sampling. It should also be noted that in some farms the livestock was destroyed as a result of military aggression.

In the territory of the Kharkiv region leptospirosis is characterized by a not clearly expressed intensity of the epizootic process , as evidenced by the data in Fig. 2. During the period between 2012 and 2020, proportion of number of seropositive animals detected was fluctuating within stable limits. But in 2014 an increase in the level of infected dogs (13.08%) was noted, and in 2017 in horses (12.99%) and dogs (12.84%), in 2023 in cows (19.90%), dogs (18.82%) and horses (15.75%). Also, research results revealed an outbreak of leptospirosis among ponies (46.43%) in 2011 and camels (57.14%) in a private zoo.

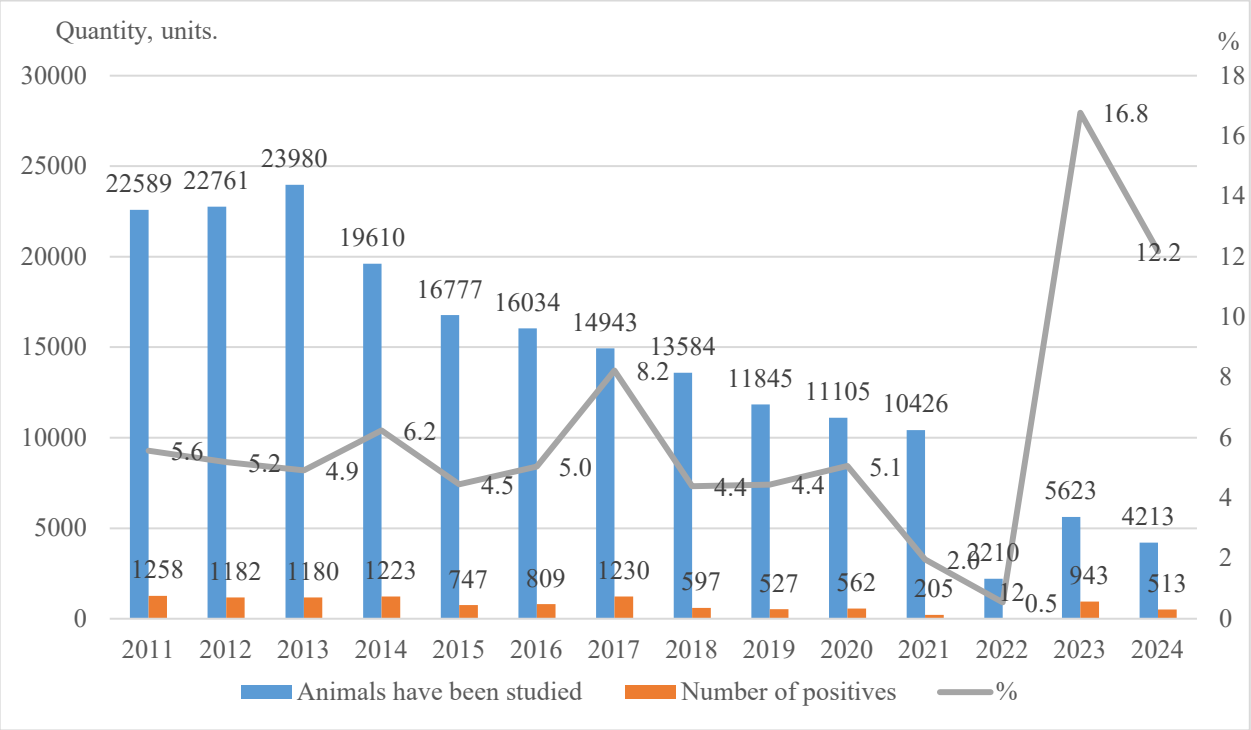

Fig. 1. Results of serological studies of animal blood for leptospirosis

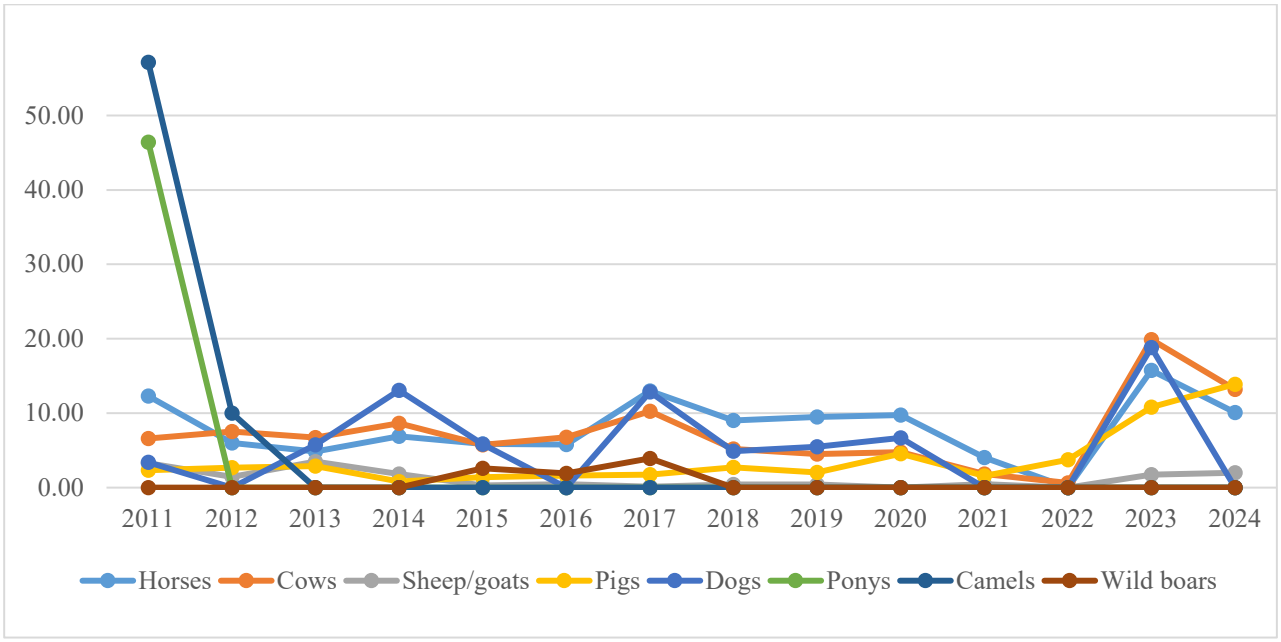

Fig. 2. The proportion of animals that react positively to leptospirosis in 2011 – 2024

It is important to note the rather low level of seroprevalence of leptospirosis among wild boars - only in the period 2015-2017, 2.6%, 1.9% and 3.93% of positive samples were detected, respectively.

At the same time, the level of seroprevalence in industrial pig farming has a tendency to increase. With an overall average indicator for 10 years of 2.47%, for the period 2011-2017 this indicator was 2.09%, in the period 2018-2024 - 5.62%, and during the period of hostilities (2022-2024) this indicator was 9.49%. These facts may indicate the complex influence of external negative factors associated with Russian aggression - the development of the economic crisis, a decrease in the quality of veterinary services due to a decrease in the number of personnel, energy and logistical factors, etc.

Analysis of the results of serological studies allowed us to establish the dominant serogroups of *Leptospira* in the etiological structure of the disease (Fig. 3). Circulation was detected 8 serogroups pathogen: *Leptospira pomona, L. icterohaemorragiae, L. canicola, L. grippotyhosa, L. tarassovi, L. polonica, L. kabura, L. bratislava*. Antibodies to were most frequently detected *L. icterohaemorragiae* among all animal species. Thus, among the horse population, *L. icterohaemorragiae* and *L. bratislava* circulate more often - 41.07% and 22.85%, respectively, while other serogroups account for from 1.73% (*L. kabura*) to 9.79% (*L. tarassovi*).

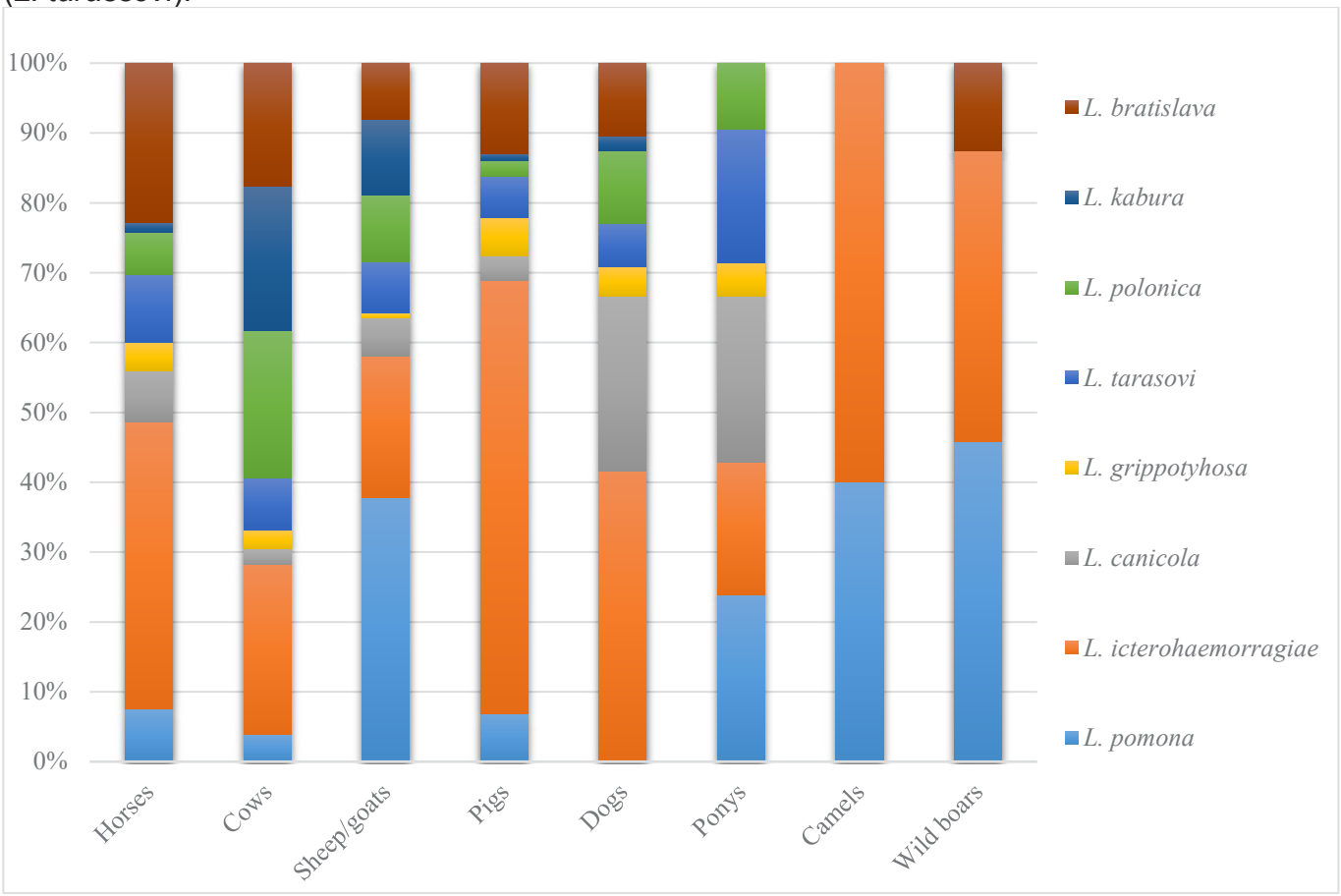

Fig. 3. Etiological structure of animal leptospirosis in the Kharkiv region for 2011 – 2024

During 2011-2024, 113,807 samples of blood serum from cows were tested for leptospirosis and 7,790 positive animals were identified (*L. icterohaemorrhagiae* 24.34%, *L. polonica* 21.05%, and others).

According to the results of studies of 11,744 blood serum samples from sheep and goats, the circulation the serovar *L. pomona* was 37.84% cases, *L. icterohaemorrhagiae* was 20.27% cases, *L. grippotyhosa* was only 0.6%.

Antibodies to *L. icterohaemorrhagiae* were detected in 61.98% and 47.67% of blood samples from pigs and dogs, respectively. It should be noted that among the pig population, serovars *L. bratislava* (12.96%), *L. pomona* (6.85%), *L. tarassovi* (5.87%), *L. grippotyhosa* (5.5%), *L. canicola* (3.55%) also circulate.

In the dog population, leptospirosis more often caused by *L. canicola* 25%, *L. polonica* (10.42%) and *L. bratislava* (10.42%).

Planned preventive serological tests for brucellosis of breeding bulls, cows, heifers, heifers over one-year-old, buffaloes, breeding rams, ewes that have remained without offspring, breeding boars and main sows are carried out in all farms once a year using a Rose-Bengal Test (RBT). If positive results are obtained for RBT, the diagnosis is clarified by

additional tests for complement substitution test and agglutination reaction. Data on the number of studies conducted by animal species are presented in Table I.

Table 1

Information on conducting serological tests for animal brucellosis in the Kharkiv region for 2011 – 2024

Years	Cattle		Sheep/goats		Pigs		Horses		Wilde boars	
	Total	Positive	Total	Positive	Total	Positive	Total	Positive	Total	Positive
2011	129325	0	23086	0	1738	0	1056	0	0	0
2012	131585	0	21428	0	12305	0	1241	0	0	0
2013	128627	0	20967	0	15702	0	963	0	0	0
2014	129325	0	23086	0	11719	0	790	0	0	0
2015	106672	0	15178	0	7185	0	704	0	182	2
2016	96415	0	13947	0	7938	0	735	0	279	2
2017	105156	20	17148	0	5292	0	726	0	0	0
2018	99454	2	16943	0	4593	0	789	0	0	0
2019	100560	0	15065	0	5570	0	819	0	0	0
2020	93501	2	14492	0	5203	0	728	0	0	0
2021	82953	1	14248	0	6695	0	674	0	0	0
2022	55178	3	4564	0	1847	0	455	0	0	0
2023	43220	2	7562	0	2195	0	412	0	0	0
2024	49817	18	11016	5	1900	0	432	0	0	4

During the period described, 1671385 blood serum samples from domestic animals were subjected to serological studies, as well as 461 blood serum samples from wild boars.

It is significant that according to the results of the study of 461 blood serum samples from wild boars, positive results were found in only 4 cases (0.0015% and 0.0016% of samples in 2015 and 2016, respectively), which indicates a low level of infection of wild boars with the brucellosis pathogen in the Kharkiv region.

During the period studied, serological studies of blood serum for brucellosis among cattle revealed positive results starting from 2017 and including 2024 (except 2019).

Thus, during the entire observation period, 1,351,788 serum samples of cows were examined (including 8,178 from homestead farms). In particular, 191 samples from aborted cows and 282 cows that gave birth to stillborn fetuses were tested. Starting in 2017, samples containing antibodies to the brucellosis pathogen began to be detected - only 48 (0.006%). The detected level of seroprevalence for brucellosis indicates the absence of circulation of the pathogen among the cattle population.

In order to spread another pathogenic microorganism from the genus *Brucella* - the causative agent of sheep brucellosis (*Brucella ovis*). A total of 27787 blood serum samples from sheep and goats were examined (Table 2).

Taking into account the general decreasing of of sheep and goats' populations in the region, a corresponding decrease in the number of samples for examination in the complement fixation test to detect the spread of the pathogen is recorded. Accordingly, the level of seroprevalence ranged from 0.57 to 3.78% (with the exception of 2011, when 10.56% of positive samples were detected within the framework of the introduction of health measures in the farm; in 2023 and 2024, 15.91% and 17.44% of positive samples were detected,

respectively - during this period, conditions for carrying out anti-epizootic measures were absent due to the conduct of hostilities in the region).

Analysis of the results obtained on the serological prevalence of brucellosis infection may indicate a stable circulation of the pathogen.

Table 2

Information on conducting serological tests for infectious epididymitis of sheep in the Kharkiv region for 2011 – 2024

Years	Total	Positive	% of positive
2011	7710	814	10,56
2012	4736	59	1,25
2013	4032	23	0,57
2014	3603	35	0,97
2015	3545	43	1,21
2016	25	0	0,00
2017	0	0	0,00
2018	779	22	2,82
2019	947	7	0,74
2020	884	25	2,83
2021	873	33	3,78
2022	12	0	0,00
2023	641	102	15,91
2024	711	124	17,44

The results of planned blood sera testing for chlamydia in the Kharkiv region in 2011–2024 are shown in Table 3.

Table 3

Information on serological tests for chlamydia in the Kharkiv region for 2011 – 2024

Year	Animals studied	Number of positives	% of positive results
2011	2165	66	3,04
2012	1343	2	0,14
2013	1401	2	0,14
2014	1280	0	0,00
2015	0	0	0,00
2016	80	13	16,25
2017	443	24	5,41
2018	628	27	4,29
2019	554	30	5,41
2020	511	20	3,91
2021	434	53	12,21
2022	302	4	1,32
2023	313	28	8,94
2024	0	0	0

The presented data shows that as a result of the study of 9454 blood serum samples, 269 positive reacting animals were detected. Reacting animals were detected almost annually, except for 2014, 2015 and 2024.

In the studied period, positively reacting animals were detected all the time throughout the territory of Kharkiv region. During the specified period, 2655 blood serum from cows were examined and 66 animals positively reacting to chlamydia were detected, which is 4.48%.

Blood serum from small cattle (2052 samples) and pigs (5307 samples) were also subjected to the study. The share of positive reacting animals was 2.92% and 1.75%, respectively.

Serological studies were performed on blood serum from poultry, namely: from chickens – 530 samples and from parrots – 50 samples, according to the results of which no positive reacting animals were detected.

Analysis of the obtained results of laboratory tests for chlamydia indicates a fairly high intensity of the epizootic process regarding this disease in the region, which is shown in Fig. 4.

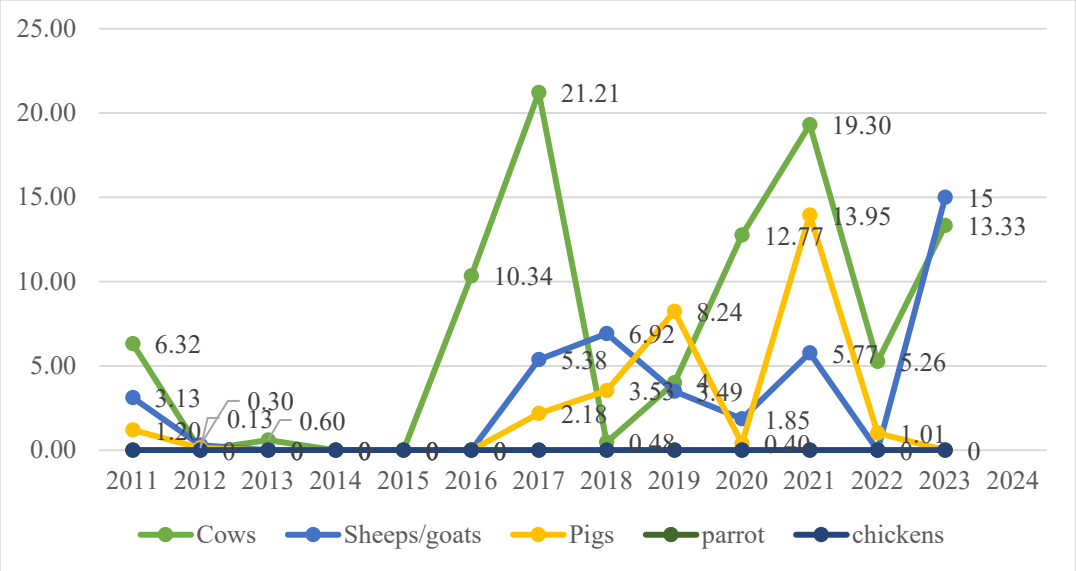

Fig. 4. Dynamics of detection of animals reacting positively to chlamydia in the Kharkiv region for 2011 – 2024

During the study period, 3975 blood sera from cattle, 6613 from domestic animals, 1287 from pigs, and 90 from poultry were subjected to serological tests for listeriosis (Table 4). No positive results were found.

Table 4

Information on monitoring studies of blood serum from animals for listeriosis in the Kharkiv region for 2011 – 2024

Years	Cows	Sheep/goats	Pigs	Birds
2011	2867	837	937	20
2012	25	421	200	0
2013	410	261	0	10
2014	311	586	0	50
2015	19	266	0	10
2016	12	213	0	0
2017	0	0	0	0
2018	1	547	0	0
2019	0	660	0	0
2020	0	660	0	0
2021	0	762	0	0
2022	0	0	0	0
2023	330	0	0	0
2024	0	1400	150	0
Total	3975	6613	1287	90

The causative agent of anthrax and the control of this disease remain a pressing problem for the veterinary service. Raw animal skins taken from slaughterhouses, slaughter points, etc. are subject to testing for anthrax. Thus, during 2011–2024, 6717 samples of raw skins were subjected to serological testing. The results of precipitation reactions were negative (Table 5).

For the timely detection and prevention of glanders, routine serological tests of blood serum for glanders are carried out (Table 6). No affected animals were found.

Table 5

Information on research on animal hides for anthrax in Kharkiv region (2011 – 2024)

Years	Cow hides	Raw leather from sheep	Raw hides from pigs
2011	986	32	10
2012	736	0	0
2013	902	0	0
2014	1807	0	10
2015	406	0	0
2016	165	3	0
2017	285	0	0
2018	329	0	0
2019	359	0	0
2020	320	0	0
2021	260	0	0
2022	23	0	0
2023	84	0	0
2024	0	0	0
Total	6662	35	20

Discussion. Having summarized the reported data on the results of serological studies for 14 years (2011 – 2024) on the spread of animal bacteriosis in the Kharkiv region, the degree of unhappiness (tension of the epizootic situation) was established, which is expressed in the epizootic index, which is determined by the formula (Elsohaby, 2023).

$$I_e = P_з/P_c, \quad (1),$$

where: Ie – epizootic index;
Pз – years in which animal disease cases were recorded;
Pc – total number of observed years.

Generalized data on the results of calculations of the epizootic index for various diseases of bacterial etiology in the Kharkiv region are presented graphically in figure 5. The calculation of the epizootic index does not include those diseases for which, according to the results of blood serum studies, no positive reactions to this indicator were detected (listeriosis, anthrax, glanders).

It was established that the epizootic index fluctuates within this indicator, detected in the range from 2.5 to 3.5, which indicates a high intensity of the epizootic process. The data presented indicate a high danger of the above-mentioned diseases and the need for a detailed study of the features of their occurrence and spread for prognostic developments and measures to combat these infections both in the Kharkiv region and in Ukraine in order to maintain epizootic well-being, food safety and compliance with one of the conditions for the entry of Ukrainian products into the international market, in particular the European Union.

According to a study conducted in Ukraine for the period 2003–2022, seropositivity for leptospirosis among cattle was 4.1%, among pigs – 2.1%, horses – 7.9%, dogs – 17.5%, cats – 13.1%, and among wild boars – 2.2%. These indicators indicate the persistence of sources of the pathogen in different animal populations (Korniienko, 2023).

Table 6

Information on blood serum tests for glanders in the Kharkiv region for 2011 – 2024

Years	Horses	Pony	Donkeys	Camels
2011	2711	49	8	2
2012	2480	51	12	0
2013	2418	49	10	0
2014	2284	37	15	0
2015	36	0	0	0
2016	188	8	0	0
2017	1762	32	0	0
2018	1821	0	0	0
2019	1740	0	0	0
2020	1640	0	0	0
2021	1558	0	0	0
2022	682	0	0	0
2023	805	0	0	0
2024	779			
Total	20905	226	45	2

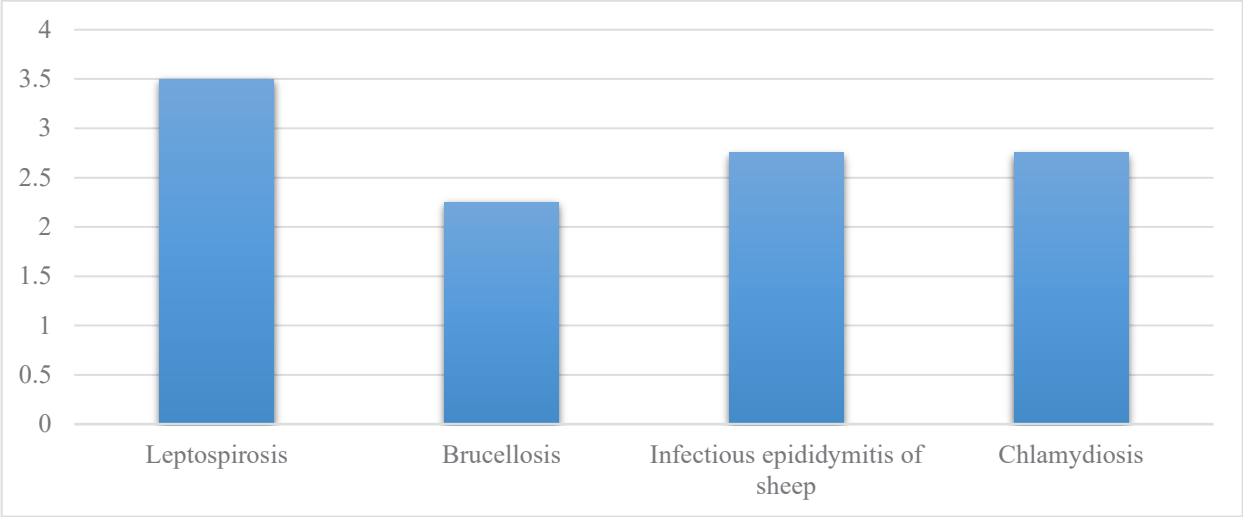

Fig. 5. Epizootic index of infectious bacterial diseases of animals in the Kharkiv region for 2011 – 2024

Similar results were obtained in the study by (Hudz, 2023): among 279 pig serum samples, 27.2% were positive for leptospirosis, indicating a significant prevalence of the pathogen among the pig population.

In their work «Occurrence of leptospiral infections in swine population in Poland evaluated by ELISA and microscopic agglutination test» (Wasiński, 2010) analyzed 7112 sera from pigs from all 16 provinces of Poland. The results showed that 1.02% of samples were positive by ELISA, and further analysis by microscopic agglutination test (MAT) revealed positive reactions to serovars *Pomona* (42.19%), *Sejroe* (32.81%) and others. These studies emphasize the importance of monitoring leptospirosis among pigs and the need to take into account regional characteristics when developing preventive measures.

Analysis of the epizootic situation of brucellosis in Ukraine (1994 – 2021) showed that the disease is registered sporadically, with 45 confirmed cases in humans. At the same time, a significant number of positive animals were detected in Sumy and Dnipropetrovsk regions, indicating the persistence of the pathogen in certain regions (Korniienko, 2023).

In China (Cao, 2018), based on the results of studies on brucellosis, found that among sheep, seropositivity for brucellosis was at the level of 2.71%, with the predominant biovar *B. melitensis 3.* This indicates similar problems with brucellosis in different countries.

Comparison of the results of chlamydia research in the Kharkiv region with international and Ukrainian studies allows us to assess the epizootic situation and identify common trends and differences. Ukrainian scientists, as a result of the study of 300 vaginal scrapings of cows and 28 samples of biological material suspected of chlamydial infection of pigs and boars, selected in private farms of the Poltava region, found *Chlamydia* spp. in 9 (3%) cows and 2 (7.14%) pigs (Zezekalo, 2020). Polish scientists described a study conducted in 97 pig farms in the country, the results of which revealed the presence of chlamydia in 71.2% of farms, with a variation from 20% to 100% of positive animals on the farm. This indicates a high prevalence of chlamydia among pigs in Poland (Rypuła, 2016). The results of studies in Kharkiv region demonstrate a lower prevalence of chlamydia among animals compared to some European countries, such as Poland. However, the stable detection of positive cases indicates the need for continuous monitoring and implementation of preventive measures. Differences in prevalence levels may be due to research methodology, animal housing conditions and other factors.

In the context of the ongoing armed conflict in Ukraine, ensuring the proper level of veterinary supervision over planned research is becoming significantly more difficult, which may lead to an aggravation of the epizootic situation. Disruption of logistics, population migration and animal movements also create additional risks for the spread of infections.

The state serological monitoring conducted by veterinary specialists of the network of laboratories of the State Service of Ukraine for Food Safety and Consumer Protection in the Kharkiv region confirms the effectiveness of the use of retrospective and statistical analysis methods, as well as visualization of results using a trend line, which allows predicting the further dynamics of the epizootic process. Predictive data is an important tool for developing preventive measures, planning vaccination, isolation measures and informing animal owners.

Thus, the results of the study confirm the need to maintain and strengthen the system of epizootic supervision over bacterial zoonoses. Particular attention should be paid to conducting annual serological surveys, informing the population, and ensuring interdisciplinary interaction between veterinary and medical services, which will contribute to increasing the level of biosecurity and reducing epizootic and epidemiological risks.

Conclusion. The results of serological laboratory diagnostic studies (tests) aimed at identifying animals reacting to bacterial pathogens indicate that the epizootic situation regarding infectious diseases of bacterial etiology in the Kharkiv region remained tense, with significant fluctuations. Analysis of the results of serological monitoring allows us to state the following: pathogens of leptospirosis, infectious epididymitis of sheep, brucellosis, chlamydia circulate in the territory of the Kharkiv region. Leptospirosis, chlamydia and infectious epididymitis of sheep cause the largest share of the release of positively reacting animals. Indicators of livestock infection with bacterial zoonoses in the Kharkiv region are characterized by a stable trend, that is, with minor jumps, or vice versa, a drop. The dynamics of the detection of positive reactants indicates a fairly high intensity of the epizootic process, for example, regarding chlamydia. Considerable attention and application of appropriate measures, especially in conditions of combat operations, requires ensuring serological monitoring of raw hides for anthrax. The epizootic index of bacterial diseases ranged from 2.5 to 3.5, which indicates a high intensity of the epizootic process of animal bacterioses in the Kharkiv region in 2011 – 2024. Further research should focus on in-depth study of the epidemiology of bacterial infections in animals, in particular on the identification of new strains of pathogens and their possible mutations. An important direction is the development of more effective methods of serological monitoring and diagnostics, which will allow for the prompt detection of infected animals and limit the spread of diseases. Special attention should be paid to improving methods for detecting bacteria in raw materials, in particular skin, in order to prevent risks to human health. Research should also cover the impact of hostilities on the spread of infections

among animals and study factors that contribute to increased epizootic tension. Further development of preventive and diagnostic measures against the most common bacterioses is critically important for stabilizing the epizootic situation in the region.

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СЕРОЛОГІЧНИЙ МОНІТОРИНГ БАКТЕРІАЛЬНИХ ЗООНОЗНИХ ПАТОГЕНІВ У ХАРКІВСЬКІЙ ОБЛАСТІ (УКРАЇНА) ЗА 2011–2024 РОКИ

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Резюме. *Метою наших досліджень було визначення поширення бактеріальних зоонозів на тваринницьких фермах та в приватному секторі Харківської області (Україна) на основі результатів серологічного моніторингу. Дослідження проводилося в Харківській регіональній державній лабораторії Державної служби з питань безпеки харчових продуктів та захисту прав споживачів, охоплюючи період 2011-2024 рр. з використанням методів ретроспективного, статистичного, структурного та епізоотичного аналізу. Отримані результати дозволили оцінити рівні інфікованості тварин бактеріозами та встановити інтенсивність епізоотичного процесу в Харківській області щодо бактеріальних інфекцій серед тварин на основі результатів дослідження 3461694 зразків сироваток крові від тварин різних видів. Згідно з результатами дослідження, у 75 251 тварини виявлено антитіла до збудників лептоспірозу, бруцельозу, інфекційного епідидиміту баранів та хламідіозу. Військові дії в регіоні, розпочаті росією, не дозволяють повною мірою впровадити відповідні ветеринарно-санітарні заходи для обмеження циркуляції відповідних збудників. Отримані результати обґрунтовують необхідність продовження регулярного серологічного моніторингу захворювань бактеріальної етіології з метою забезпечення здоров'я населення та своєчасної профілактики зоонозів.*

Ключові слова: бактеріальні зоонози, серологічні тести, лептоспіроз, бруцельоз, хламідіоз.

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