

С.Сейфуллин атындағы Қазақ агротехникалық университетінің Ғылым жаршысы (пәнаралық) = Вестник науки Казахского агротехнического университета им. С.Сейфуллина (междисциплинарный). - 2022. - №3 (114). –Ч.2. - Р. 167-180

EPIZOOTIC SITUATION OF ANIMAL EMCAR (BLACKLEG) ON THE TERRITORY OF THE REPUBLIC OF KAZAKHSTAN FOR 2010-2020

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Annotation

The article presents the results of epizootological monitoring of emcar in animals based on the analysis of official reporting data of the veterinary service of

the Republic of Kazakhstan for 2010-2020 and the results of the authors' own research.

The main epizootological indicators of the epizootic process in the country have been established, the incidence areas that affect the unfavorable and tense epizootic situation for this disease have been determined. The focality indicator on emcar, for this period of time, averaged from 1 to 4 animals, which indicates the non-contagiousness of the infection. By studying the occurrence of the disease on the territory of the Republic of Kazakhstan over the years, the frequency of epizooties has not been established. An analysis of the monthly dynamics of the disease focus showed that blackleg manifests itself in a greater number mainly in October and November. Emcar foci are least or not registered at all in the winter months and early spring (December, January, February and March).

For the period from 2010 till 2020 (11 years) on the territory of the Republic of Kazakhstan, a high degree of incidence was observed in 3 regions (West Kazakhstan, East Kazakhstan, Zhambyl), an average degree - in 3 regions (Almaty, Aktobe, Pavlodar), and in other 4 regions (Kostanay, Atyrau, Karaganda, Akmola) - the degree of incidence was low.

Based on assessing and retrospective analysis of the established epizootological indicators, epizootological zoning maps were developed showing the blackleg status of each region.

According to the compiled map of the epizootic situation, for the period from 2010 to 2020, 71.4% of the territory of 10 regions of the Republic of Kazakhstan turned out to be disadvantaged for animal blackleg. The territory of the remaining 4 regions (28.6%) of the republic (Kyzylorda, North Kazakhstan, Mangystau, Turkestan) is safe from animal emcar.

The obtained new scientific data on the dynamics of epizootic situation on emcar on the territory of the Republic of Kazakhstan can be used in drawing up a plan and carrying out preventive measures, development of effective measures to control animal emcar.

Key words: infection; epizootology; emphysematous carbuncle; monitoring; epizootic focus; intensity of the epizootic situation.

Introduction

Emphysematous carbuncle (EMCAR) - acute contagious enzootic disease that

occurs in disadvantaged areas, manifests itself mainly by severe focal lesion of muscles in the form of crepitating necrosis and serosanguineous infiltration of adjacent adipose layer. Cattle are susceptible to emcar, which usually get sick at the age of three months to four years; buffaloes get sick more often at the age of 1-2 years; sheep,

goats and moose can get emcar much less often. [1,2,3].

The causative agent of the disease is *Clostridium chauvoei*, an obligate anaerobe, having the form of polymorphic spores containing rods. The spores remain in the soil for a long time, posing a danger to infect susceptible animals. The source of the causative agent is animals sick

with emcar, in the corpses of which spores are formed, which infect the soil, feed, water. Emcar usually occurs on pastures, more often in hot, dry summers. Under these conditions, animals, eating dry grass, simultaneously capture particles of ground together with the spores of the causative agent. Emcar is characterized by permanence, which is due to the long-term preservation of the pathogen in the external environment (soil, water) [4,5,6].

Emphysematous carbuncle is registered in all countries of the world. [7,8,9,10]. In the CIS, emcar is registered in all regions, including Kazakhstan [11,12].

If the disease is not detected on time and appropriate measures are not taken, it will cause serious damage to the livestock of the republic. A large volume of preventive and forced vaccinations against emcar annually also requires significant financial resources. In disadvantaged farms, emcar causes great damage due to the death of animals and the cost of antiepzootic measures [13, 14].

However, despite the ongoing antiepzootic measures and planned

Materials and methods

When carrying out the research work, research methods officially specified for the diagnosis of animal emcar according to GOST 26503-85 were used. Bacteriological studies of organs of animals sick or suspected of being sick, as well as objects of external environment (soil, water, animal feed) were carried out in order to detect the causative agent of the disease by applying classical methods

preventive vaccinations, the disease remains a serious problem in disadvantaged areas.

According to most researchers, it is practically impossible to develop optimal scientifically basic systems for eliminating of epizootic center of infectious diseases without constant epizootic monitoring. Monitoring of infectious animal diseases, as a system of dynamic and comprehensive monitoring of the epizootic process in a certain area, contributes to the development of rational planning and implementation of measures to fight infectious diseases [15].

Based on the urgency of the problem, these scientific studies are aimed at conducting and analyzing epizootological monitoring of emphysematous carbuncle in animals on the territory of the Republic of Kazakhstan within recent years, determining the main indicators of the epizootic process and tension of the epizootic situation on this disease. The results of the conducted research can be used in the planning and implementation of antiepzootic measures.

using nutrient media conforming to GOST 32732-2014.

To carry out epizootological monitoring of emcar, the methods described in the relevant manuals were used [16, 17].

In order to study the epizootological manifestation and control of animal emcar, the following were used and analyzed:

– statistical reviews and official reports on veterinary safety on animal

emcar by the Committee for Veterinary Control and Supervision of the Ministry of Agriculture of the Republic of Kazakhstan and the Republican state enterprise "Republican Veterinary Laboratory";

– materials of clinical and epizootological examinations of epizootic center of animal emcar and assessments of epizootic situations in various regions of the republic;

– results of laboratory studies of biomaterial samples (blood, blood serum, samples of lean tissue, organs and lymphnodes, etc.) obtained from of animals sick or suspected of being sick with emcar, as well as in the case of an outbreak of emphysematous carbuncle brought from various farms of the regions of the republic;

– materials of the regular assessing the epizootic situation on emcar in the districts and regions of the republic;

– materials of republican and regional scientific and practical conferences and seminars on especially dangerous animal diseases, including on emcar.

The collected data are arranged in chronological order, which makes it possible to trace the relationship between individual cases of the disease, to identify their recurrence in a certain area and in certain years. The research results are included in tables, graphs or diagrams and accompanied by an appropriate explanatory note.

For zoning the territory of a region having regard to epizootological data, retrospective data on incidence degree of epizootic foci of animal emcar over a number of years in the context of individual regions were used, epizootological maps of regions were analyzed and compiled, where areas with varying degrees of risk of infection were identified.

Results

At the beginning of the work, we collected and analyzed data on epizootic foci of emcar registered on the territory of the Republic of Kazakhstan over the past 11 years (Table 1).

Table 1 - The number of registered epizootic foci of emcar on the territory of the Republic of Kazakhstan for 2010-2020.

Oblast	Years and number of registered emcar foci:											For the entire period
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	
West Kazakhstan	38	19	7	15	23	31	8	3	10	25	47	226
East Kazakhstan	14	7	5	0	8	5	3	12	13	13	12	92
Zhambyl	0	3	4	3	4	2	4	15	7	10	1	53
Almaty	1	0	0	0	0	1	1	14	5	7	4	33
Aktobe	2	3	2	0	1	2	1	2	3	3	8	27

Pavlodar	0	0	0	0	1	3	2	1	0	2	5	14
Kostanay	1	0	3	0	0	1	2	0	0	1	1	9
Atyrau	3	2	0	0	0	0	0	0	1	1	1	8
Karaganda	0	0	0	1	2	0	0	0	1	1	1	6
Akmola	1	0	1	0	0	0	0	0	0	0	1	3
Kyzylorda	0	0	0	0	0	0	0	0	0	0	0	0
North Kazakhstan	0	0	0	0	0	0	0	0	0	0	0	0
Mangystau	0	0	0	0	0	0	0	0	0	0	0	0
Turkestan	0	0	0	0	0	0	0	0	0	0	0	0
Total	60	34	22	19	39	45	21	47	40	63	81	471

As can be seen from Table 1, 471 foci of emcar cases were registered on the territory of the Republic of Kazakhstan for the entire period. From 2010 to 2013, there was a tendency to decrease in the number of emcar foci from 60 to 19, but starting from 2014, their number

gradually began to increase from 39 to 81 in 2020, with a slight decrease in their number in 2016 to 21 and 2018 to 40.

The analysis of the number of emcar foci on the territory of the Republic of Kazakhstan in the context of oblasts for the entire period 2010-2020 is shown in Figure 1.

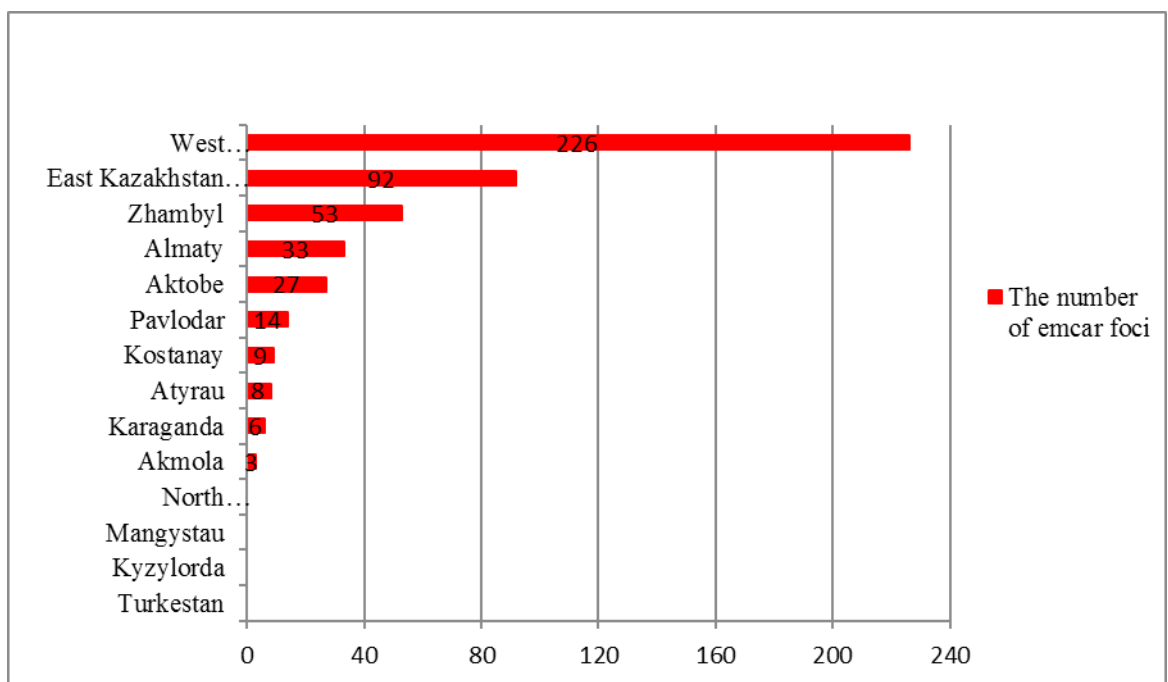


Figure 1 – The number of emcar foci on the territory of the Republic of Kazakhstan in the context of regions for 2010-2020

As can be seen from Figure 1, according to the total number of registered emcar foci for 11 years, the West Kazakhstan oblast (226 foci) and East Kazakhstan oblast (92) prevail, followed by Zhambyl (53),

Almaty (33) Aktobe (27), Pavlodar (14) oblasts. In the other 4 oblasts, single foci (from 3 to 9) were registered and in the remaining 4 oblasts, persistent safety on this

infection was observed during this period.

At the next stage of research, the place of emcar in the general pathology of acute infectious animal diseases on the territory of the Republic of Kazakhstan for 2010-2020 was determined. During this period (11 years) 2212 foci of acute infectious diseases of animals have been registered on the territory of the

Republic of Kazakhstan, 471 of them are emcar foci, i.e., the share of emcar in the total number of foci of acute infectious diseases is 21.2%.

Figure 2 shows the share of emcar in the total number of foci of acute infectious diseases of animals, in % divided up by oblasts of the Republic of Kazakhstan for 2010-2020.

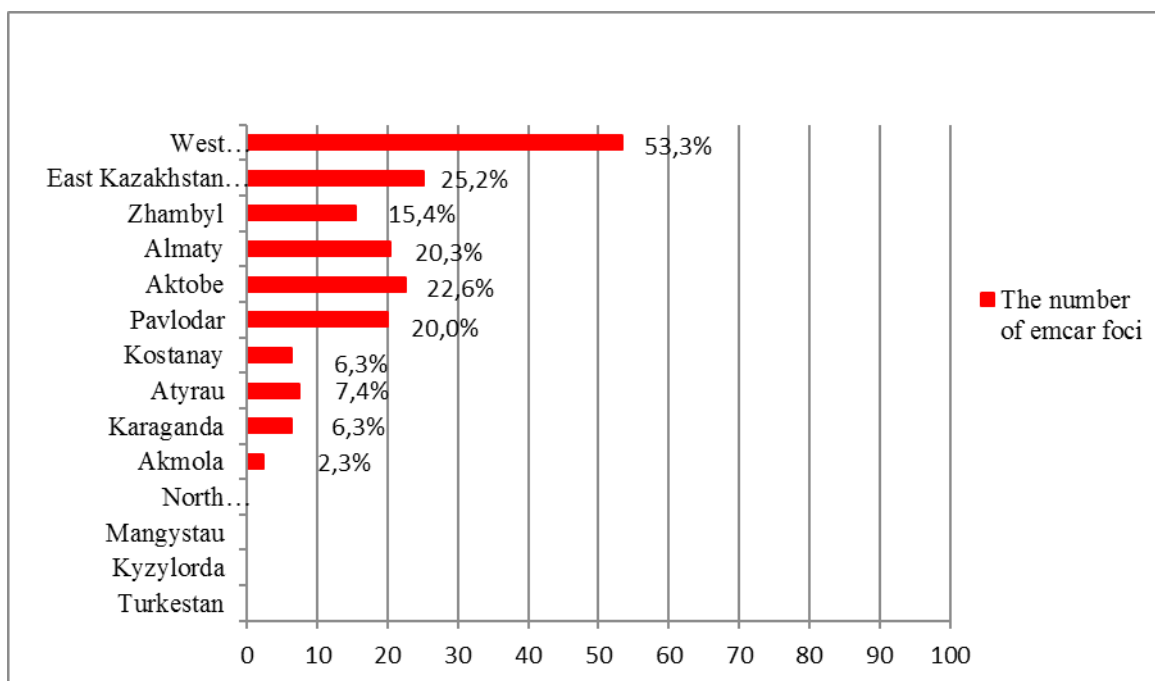


Figure 2 – The share of emcar in the total number of foci of acute infectious diseases of animals, in % divided up by oblasts of the Republic of Kazakhstan for 2010-2020.

As can be seen from Figures 1 and 2, a large number of emcar foci during this period were observed in West Kazakhstan (226), East Kazakhstan (92) and Zhambyl (53) oblasts. The share of emcar in the total number of foci of acute infectious animal diseases in these areas ranged from 15.4% to 53.3%.

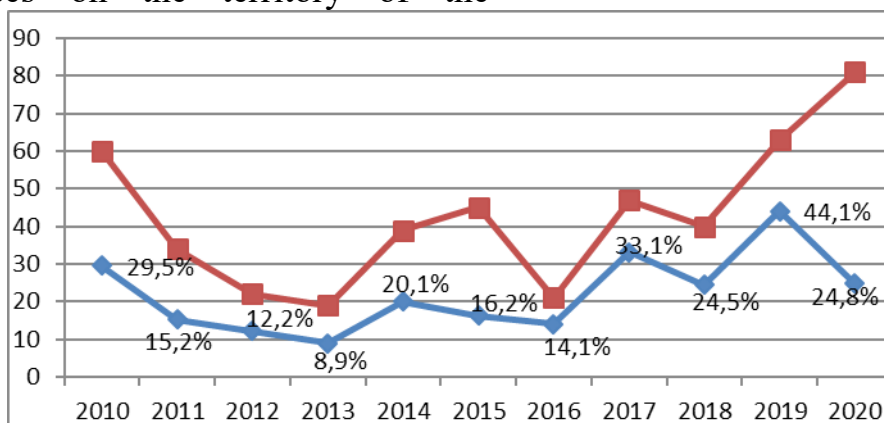
The average degree of emcar spread was noted in 3 oblasts - in Almaty (33), Aktobe (27), Pavlodar (14), the share of emcar in the total

number of foci ranges from 20.0 to 22.6%. And in other 4 oblasts (Kostanay (9), Atyrau (8), Karaganda (6), Akmola (3) – where the spread of emcar was low, the share of emcar in the total number of foci is from 2.8% to 7.4%.

In the remaining 4 oblasts (Kyzylorda, North Kazakhstan, Mangystau, Turkestan), a safe situation on emcar has been maintained during this time.

The dynamics of emcar foci and its share in the total number of foci of acute infectious animal diseases on the territory of the

Republic of Kazakhstan for 2010-2020 is shown in Figure 3.



Note: Red - number of registered emcar foci; Blue - the share of emcar in the total number of foci of acute infectious diseases, in %.

Figure 3 - Diagram of emcar foci on the territory of the Republic of Kazakhstan and its share in the total number of foci of acute infectious animal diseases for the period from 2010 to 2020

Figure 3 shows that 60 unfavorable emcar foci were registered in 2010, then there is a gradual decrease until 2013, since 2016 the number of foci has been increasing annually and in 2020 it reached 81. This is the highest figure for the last 11-year period. In 2014-2015, the number of emcar foci was twice as large as in 2013 and 2016. In 2017, there was an increase in the number of emcar foci (47) compared to 2016 (21) by two times, and in 2020 (81) by four times.

The lines of the diagram indicating the share of emcar in the total number of foci of acute animal diseases show that all these years it goes almost parallel with the foci of emcar, the exception is only 2020, when the largest number of emcar foci

was observed over an 11-year period (81), and the share of emcar in the total number of foci of acute animal diseases decreased almost in twice (24.8%) compared to the previous year (44.1%).

Thus, the analysis of the number of registered emcar foci with a running time of 11 years (2010-2020) indicates an annual, significant spread of emcar on the territory of 10 oblasts of the Republic of Kazakhstan (from 19 to 81 foci) and its permanence. It should also be noted that the indicators of emcar share in the total number of foci of acute animal diseases over these years had a positive correlation with emcar foci, which indicates one of the dominant roles of this infection in the epizootic process of acute infectious animal diseases registered on the territory of the Republic of Kazakhstan.

To determine the extent of the spread of emcar infection across the territory of the Republic of Kazakhstan, having used the data

from Table 1, the average annual number of epizootic foci of emcar in the Republic of Kazakhstan for 2010-2020 (11 years) was established, which amounted to 33 foci. The ranking of the territory of the oblasts according to the disease distribution was carried out according to the principle: the areas where foci over the average annual indicator (33) were registered during this period were classified as territories with a high emcar spread (West Kazakhstan -226, East Kazakhstan - 92, Zhambyl - 53); the remaining regions with the

number of foci from 1 to 33 were divided into 2 categories: from 16.5 to 33 foci - with an average spread of the disease (Almaty - 33, Aktope - 27, Pavlodar – 14); from 1 to 16.5 – with a low spread of the disease (Kostanay - 9, Atyrau - 8, Karaganda - 6, Akmolinsk - 3).

Figure 4 below shows a map zoning the territory of the Republic of Kazakhstan by the extent of the spread of emcar foci over 11 years (2010-2020).



Figure 4 - Zoning of Kazakhstani territory according to the degree of emcar distribution for 2010-2020.

Symbols: **Red** – territories with a high emcar distribution; **Yellow** – territories with an average emcar distribution; **Blue** - territories with low emcar distribution; **Green** – areas free of emcar

As can be seen from Figure 4, the territories with a high prevalence of emcar include the West Kazakhstan, East Kazakhstan and Zhambyl regions; the Almaty, Aktope, Pavlodar regions - with an average spread of the disease; and the territories with a low degree of emcar distribution include Kostanay, Atyrau, Karaganda and Akmola regions. The safe zone for this period includes the

territory of the remaining 4 regions: North Kazakhstan, Kyzylorda, Mangystau and Turkestan oblasts, where no cases of emphysematous carbuncle were registered during this period.

To characterize the epizootic process of an infectious disease, an epizootological indicator is used, as focality defining the average number of animals that have become ill in one

epizootic focus or an unfavorable point. We have determined the indicator of emcar focality on the territory of the Republic of Kazakhstan for 2010-2020. At the same time, it was found that on average there are from 1 to 4 animals per one emcar focus, which indicates the non-contagiousness of emcar infection.

Another indicator, seasonality, is known to be one of the most important characteristics of an epizootic process. Seasonal pattern of this disease depends on the climatogeographic, economic

conditions of the area, on time of planned preventive vaccination campaigns. Accordingly, variations in timing of activation of the epizootic process are possible.

The seasonality of the manifestation of emphysematous carbuncle has been analyzed by us on the example of the manifestation of emcar outbreaks in the Republic of Kazakhstan over the past 5 years.

Table 2 – Dynamics of emcar manifestation on the territory of the Republic of Kazakhstan for the period from 2016 to 2020

Number of foci in	months												Total emcar foci
	1	2	3	4	5	6	7	8	9	10	11	12	
2016	0	0	3	0	0	2	0	2	2	2	9	1	21
2017	0	0	0	0	0	0	5	7	8	18	9	0	47
2018	0	1	0	1	1	3	4	6	6	13	5	0	40
2019	1	1	0	0	1	4	8	7	8	24	7	2	63
2020	4	3	4	3	2	3	3	4	6	7	39	3	81
Total for 2016-2020	5	5	7	4	4	12	20	26	30	64	69	6	252
% of the total number of emcar foci	1,98	1,98	2,7	1,58	1,58	4,7	7,9	10,3	11,9	25,4	27,4	2,4	

As can be seen from Table 2 for 2016-2020, 252 epizootic emcar foci were registered on the territory of the Republic of Kazakhstan, which occurred in different months of the year, as shown in Figure 4.

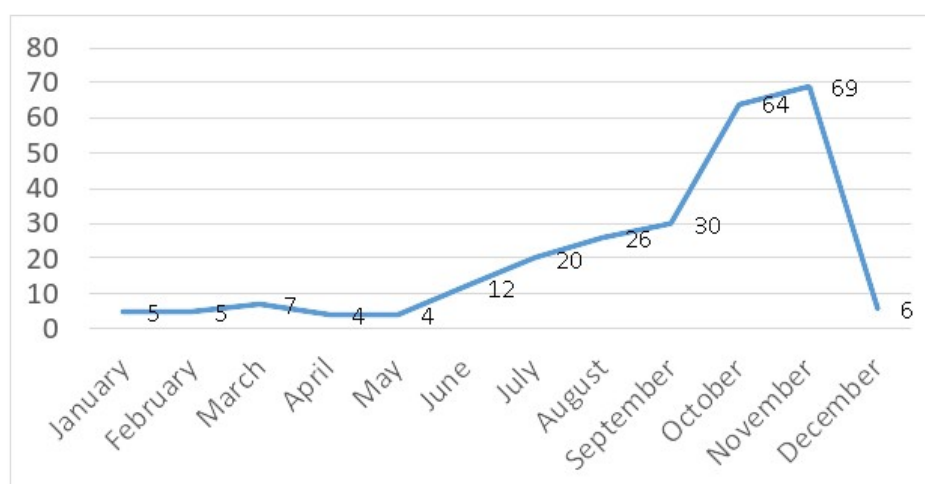


Figure 5 - Monthly dynamics of emcar foci on the territory of the Republic of Kazakhstan for 2016-2020

As can be seen from Figure 5, the maximum number of registered foci over these years falls on November. This month, 69 foci were registered, which is 27.4% of the total number (252) of registered emcar foci. This indicator in descending order in October was 25.4%, in September - 11.9%, in August - 10.3%, in July - 7.9% and in June - 4.7%. In March and December, the number of epizootic foci of emcar was 2.7% and 2.4%, respectively. In January and February, 1.9% were registered, and in April and May, 1.6% of foci of the total number of registered emcar foci over a 5-year period.

Thus, an analysis of the monthly dynamics of emcar foci shows that over a five-year period, the disease manifests itself in greater numbers mainly in October and November (from 25.4 to 27.4%), in June and September from 4.7 to 11.9%, in the remaining months are less (from 1.6 to 2.7%). Emcar foci were least common in winter months (December, January, February) and

early spring (March, April, May). These data allow us to conclude that it has seasonal manifestation in the Republic of Kazakhstan in October, November and August-September.

Another epizootological indicator characterizing an infectious disease is the periodicity of epizooties. According to the results of observing the epizootic process of emcar on the territory of the Republic of Kazakhstan for 2010-2020, the periodicity of epizooties has not been established.

For nosological characteristics of an infectious disease, a coefficient assessing the epizootic tension is also used. We have determined the epizootic tension on emcar on the territory of the Republic of Kazakhstan.

The intensity of the epizootic situation – this is a comparative characteristic of specific territories according to the degree of incidence of the epizootic process (intensity of manifestation) for individual nosological forms, which is calculated by the formula:

$$W = n/N * t/T, \text{ where:}$$

W – the intensity coefficient of the epizootic situation;

n – the number of unfavorable emcar foci for 2010-2020;

N – the total number of foci of acute infectious diseases for 2010-2020;

t – the number of years during which the disease was registered;

T – observation time (years).

At the beginning, we determined the share of emcar in the total number of foci of acute infectious animal diseases, in % (according to $SE = n/N$) and the epizootic index (according to $EI = t/T$). These indicators are necessary for

comparative characteristics of the territories of the Republic of Kazakhstan on distribution of emcar.

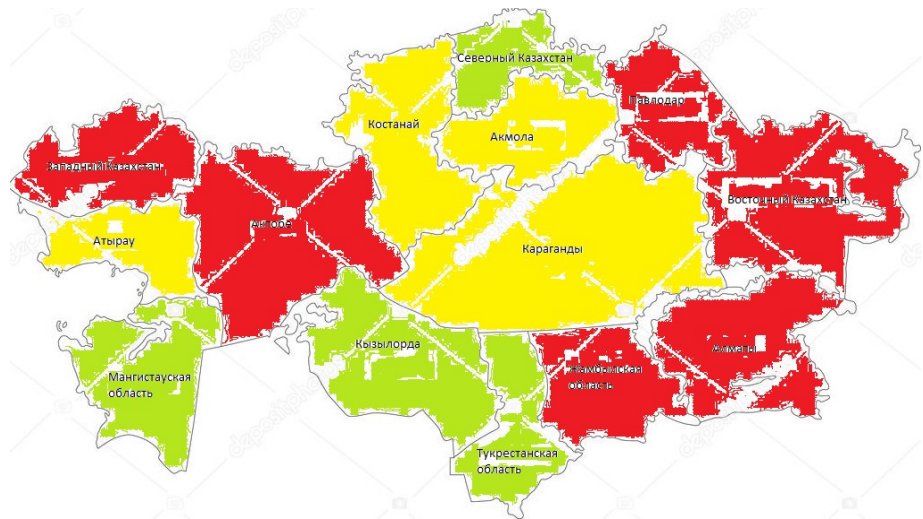
Table 3 presents the main indicators of the epizootic process characterizing the intensity of the epizootic situation on emcar on the territory of the Republic of Kazakhstan for 2010-2020.

Table 3 - Intensity of the epizootic situation on emcar on the territory of the Republic of Kazakhstan for the period from 2010 to 2020.

o	N	Oblast	Indicators of the epizootic process of emcar:						
			n	N	SE -%	t	T	EI	W
1		West Kazakhstan	226	424	53,3	11	11	1,0	0,53
2		East Kazakhstan	92	365	25,2	10	11	0,90	0,22
3		Aktobe	27	119	22,6	10	11	0,90	0,21
4		Zhambyl	53	344	15,4	11	11	1,0	0,15
5		Almaty	33	162	20,3	7	11	0,63	0,13
6		Pavlodar	14	70	20,3	6	11	0,54	0,11
7		Kostanay	9	142	6,3	6	11	0,54	0,10
8		Karaganda	6	95	7,4	5	11	0,45	0,04
9		Atyrau	8	108	6,3	4	11	0,36	0,01
0		Akmola	3	107	2,3	3	11	0,27	0,01
1		Kyzylorda	0	12	0	0	11	0	0
1		North Kazakhstan	0	82	0	0	11	0	0
2		Mangystau	0	42	0	0	11	0	0
3		Turkestan	0	140	0	0	11	0	0
4		Total	471	2212					0,11

Table 3 shows that on the territory of the Republic of Kazakhstan for 2010-2020, the average intensity of the epizootic situation on emcar was 0.11. Therefore, areas with indicators above 0.11 were classified as territories with a high, and below 0.11 with a low degree of intensity of the epizootic situation on emcar. Oblasts with W=0 (Kyzylorda, North Kazakhstan, Mangystau, Turkestan region) were safe from emcar during this period of time.

Based on the data, a zoning map of the intensity of the epizootic situation on emcar on the territory of the Republic of Kazakhstan for 2010-2020 was compiled, which is reflected in Figure 6.



*Symbols: **Red** – areas with a high degree of intensity of the epizootic situation; **Yellow** – areas with a low degree of intensity; **Green** – areas free of emcar.*

Figure 6. Zoning map of the intensity of the epizootic situation on emcar in the Republic of Kazakhstan for 2010-2020,

As can be seen from Figure 6, in 2010-2020, in 6 oblasts of the Republic of Kazakhstan (West Kazakhstan, East Kazakhstan, Aktobe, Zhambyl, Almaty, Pavlodar), which accounts for 42.8% of the entire territory of the republic, there was a high degree of tension of the epizootic situation on emcar; 4 oblasts (Kostanay, Karaganda, Atyrau, Akmola,) that is 28.6% of the territory of the republic have a low degree of tension of the epizootic situation.

Thus, 71.4% of the territory of the Republic of Kazakhstan for the period 2010-2020 turned out to be unfavorable on emcar of animals. The territory of the remaining 4 oblasts (28.6%) of the republic (Kyzylorda, North Kazakhstan, Mangystau, Turkestan) is safe from emcar animals.

Discussion

Thus, we have collected and analyzed data on epizootic foci of acute infectious animal diseases registered on the territory of the Republic of Kazakhstan, including emcar over the past 11 years (2010-2020). During this time, 2212 foci of acute infectious animal diseases were registered in the Republic of Kazakhstan, 471 of them are emcar foci, i.e., the share of emcar in the total number of foci of acute infectious diseases is 21.2%, which indicates the predominant role of this infection in the epizootic process of

acute infectious animal diseases on the territory of the Republic of Kazakhstan.

According to the total number of emcar foci for 11 years, the first place is occupied by the West Kazakhstan oblast (226 foci), East Kazakhstan oblast (92) is the second, followed by Zhambyl (53), Almaty - (33) Aktobe (27), Pavlodar (14) oblasts. In the other 4 oblasts (Kostanay, Atyrau, Karaganda, Akmola) there were rare cases of emcar (from 3 to 9) and the remaining 4 oblasts (North Kazakhstan,

Kyzylorda, Mangystau and Turkestan) were safe from this infection during this period.

The analysis of dynamics of epizootic emcar foci shows that from 2010 to 2013 there is a gradual decrease in the number of emcar foci from 60 to 19, but since 2014 their number has gradually begun to increase from 39 to 81 in 2020.

The analysis of number of registered emcar foci in 2010-2020 indicates an annual, significant spread of emcar on the territory of 10 regions (from 19 to 81 foci) and its permanence.

To characterize the epizootic process, we have determined the emcar focality index on the territory of the Republic of Kazakhstan for 2010-2020. At the same time, it was found that on average there are from 1 to 4 animals per emcar focus, which indicates the non-contagiousness of emcar infection, these data are consistent with the data of other researchers [18].

Another epizootological indicator characterizing an infectious disease is the frequency of epizootics. This is the phenomenon of ups and downs of the epizootic process, usually repeated every few years. The frequency is especially characteristic for those epizootics that, due to the high contagiousness of pathogens, affect most susceptible animals, as well as for spontaneously developing epizootics when effective antiepidemic measures are not carried out.

By observation of the epizootic process of emcar on the territory of the Republic of Kazakhstan for 2010-

2020, the periodicity of epizootics has not been established.

Another indicator - seasonality, as is known, is one of the most important characteristics of the epizootic process. Its presence can be indicated by identifying regular, repeated over many years, increases in the intensity of the process at certain times of the year. The nature of seasonality of this disease depends on climatogeographic and economic conditions of an area. They also depend on time of planned preventive vaccination campaigns.

The data on studying the seasonality of the epizootic process is used in the planning of antiepidemic, veterinary-sanitary and preventive measures, therefore, is of urgent importance.

The seasonality of manifesting of emphysematous carbuncle has been analyzed by us using the example of example manifestation of emcar outbreaks in the Republic of Kazakhstan over the past 5 years.

According to Y. R. Kovalenko [19], emphysematous carbuncle is mainly registered in summer and autumn months, i.e., during the period when animals are on pastures, the maximum number of cases of emphysematous carbuncle occurred in September and amounted to 22.2% of the total number of cases of the disease that occurred during the year. Studying the dynamics of of emphysematous carbuncle for 10 years M.N.Aizatullayev, [20] found out that the maximum number of cases is in October (23.3%) and the minimum is in January (2.1%), February (2.0%) March (2.3%).

The data consistent with the opinions of the above authors were obtained in our research. The seasonality of manifestation of emphysematous carbuncle has been analyzed by us on the example of emcar outbreaks in the Republic of Kazakhstan over the past 5 years. At the same time, the maximum number of registered foci over these years falls on November. This month, 69 foci were registered, which is 27.4% of the total number (252) of registered emcar foci. This indicator in descending order in October was 25.4%, in September -11.9%, in August - 10.3%. The least number of emcar foci was encountered in winter months (December, January, February) and early spring (March, April, May). These data allow us to conclude that emcar is manifested in October, November and August-September. As a result, researchers and veterinary workers are aimed at finding the causes and factors of this and correcting the ongoing preventive and anti-emcar measures.

For the nosological characteristics of an infectious disease, a coefficient is also used to

Conclusion

Over the period from 2010 to 2020, 2212 foci of acute infectious animal diseases were registered on the territory of the Republic of Kazakhstan, of which 471 are foci of emcar, i.e., the share of emcar in the total number of foci of acute infectious diseases is 21.2%, coming second only to brucellosis and rabies, which indicate the predominant role of this infection in the infectious

assess the intensity of the epizootic situation. We have determined the intensity of the epizootic situation on the emcar in the territory of the Republic of Kazakhstan. It was found that in 2010-2020, a high degree of tension was observed in 6 regions, which makes up 42.8% of the entire territory of the republic; in 4 regions, which makes up 28.6% of the territory of the republic, a low degree of tension of the epizootic situation was noted according to the emcar of the epizootic situation.

Thus, 71.4% of the territory of the Republic of Kazakhstan for the period 2010-2020 are unfavorable for animal emcar. The territory of the remaining 4 oblasts (28.6%) of the republic (Kyzylorda, North Kazakhstan, Mangystau, Turkestan) turned out to be safe from animal emcar.

The data obtained during epizootological monitoring of emcar should be taken into account and used when planning and conducting anti-epizootic measures for animal emcar on the territory of the Republic of Kazakhstan.

pathology of animals in the Republic of Kazakhstan.

Analysis of the number of registered emcar foci in 2010-2020 indicates an annual, significant spread of emcar in 10 oblasts of the Republic of Kazakhstan (from 19 to 81 foci). 4 oblasts (North Kazakhstan, Kyzylorda, Mangystau and Turkestan regions) were free from this infection during this period.

Values of some epizootological indicators characterizing the manifestations of the epizootic process of emcar on the territory of the Republic of Kazakhstan have been established:

the indicator of emcar focality in the Republic of Kazakhstan for 2010-2020 averaged from 1 to 4 animals, which indicates the non-contagiousness of emcar infection;

during this period, the frequency of epizootics on the territory of the Republic of Kazakhstan has not been established;

the seasonal manifestation of emcar on the territory of the republic was established in October, November and August-September. That is to make researchers and veterinary workers aim at finding the causes and factors of this and

correcting the ongoing preventive and anti-emcar measures;

the intensity of the epizootic situation on emcar in the Republic of Kazakhstan is determined. It was found that in 2010-2020, in 6 oblasts, which accounts for 42.8% of the entire territory of the republic, a high degree of intensity was observed; in 4 oblasts (28.6% of the territory), there was a low degree of intensity. The territory of the remaining 4 oblasts (28.6%) of the republic (Kyzylorda, North Kazakhstan, Mangystau, Turkestan) was free from animal emcar.

New epizootological data found as a result of monitoring of emcar in the Republic of Kazakhstan can be used in drawing up plans and conducting preventive and health measures.

Information about financing

The research was carried out within the framework of the project of the scientific and technical program "To study the epizootological characteristics of the territory on highly dangerous diseases and develop veterinary and sanitary measures to improve their efficiency" under the budget program 267 "Improving the availability of education and scientific research of the Ministry of Agriculture of the Republic of Kazakhstan"

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ЭПИЗОТИЧЕСКАЯ СИТУАЦИЯ ПО ЭМФИЗЕМАТОЗНОМУ КАРБУНКУЛУ ЖИВОТНЫХ НА ТЕРРИТОРИИ РК ЗА 2010-2020 ГГ.

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Аннотация

В статье приводятся результаты эпизоотологического мониторинга по эмкару животных на основе анализа официальных данных отчетности ветеринарной службы РК за 2010-2020 годы и результатов собственных исследований авторов.

Установлены основные эпизоотологические показатели эпизоотического процесса эмкара на территории страны, определены ареалы распространения инфекции, влияющие на неблагополучие и напряженность эпизоотической ситуации по этой болезни. Показатель очаговости по эмкару, за этот период времени составил в среднем от 1 до 4 животных, что свидетельствует о неконтагиозности эмкарной инфекции. Изучением повторяемости болезни на территории РК за эти годы, периодичность эпизоотий эмкара не установлена. Анализ помесечной динамики очагов эмкара показало, что в большем количестве болезнь проявляется в основном в октябре и ноябре месяцах. Меньше всего или совсем не зарегистрированы очаги эмкара в зимние месяцы и рано весной (декабрь, январь, февраль и март).

За период с 2010-2020 гг (11 лет) на территории РК высокая степень распространения эмкара наблюдалась в 3 областях (Западно-Казахстанская, Восточно-Казахстанская, Жамбылская), средняя степень в 3 областях (Алматинская, Актюбинская, Павлодарская), а в других 4 областях (Костанайская, Атырауская, Карагандинская, Акмолинская) - степень распространения эмкара была в низкой степени.

На основе оценки и ретроспективного анализа установленных эпизоотологических показателей разработаны эпизоотологические карты зонирования с отображением статуса по эмкару каждой области.

Согласно составленной карты напряженности эпизоотической ситуации 71,4% территории 10 областей РК за период 2010-2020 годы оказались неблагополучными по эмкару животных. Территория остальных 4 областей (28,6%) республики (Кызылординская, Северо-Казахстанская, Мангыстауская, Туркестанская) является благополучными от эмкара животных.

Полученные новые научные данные о динамике эпизоотической ситуации эмкара на территории РК могут быть использованы при составлении плана и проведении профилактических мероприятий, разработке эффективных мер борьбы с эмкаром животных.

Ключевые слова: инфекция; эпизоотология; эмфизематозный карбункул; мониторинг; эпизоотический очаг; напряженность эпизоотической ситуации.

2010 - 2020 ЖЖ. ҚР АУМАҒЫНДАҒЫ ЖАНУАРЛАР ҚАРАСАНЫНЫҢ ІНДЕТТІК ЖАҒДАЙЫ

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Түйін

Мақалада Қазақстан Республикасы ветеринария қызметінің 2010-2020 жылдардағы ресми есеп деректерін талдау және авторлардың жеке зерттеулері нәтижелері негізінде жануарлардың қарасан ауруының індеттанулық мониторинг нәтижелері баяндалады.

Ел аумағындағы жануарлардың қарасан ауруының індеттік процесінің негізгі эпизоотологиялық көрсеткіштері және осы ауру бойынша қолайсыздық пен індеттік ахуалдың шиеленісуіне әсер ететін инфекцияның

таралу аймақтары анықталды. Осы уақыт аралығында тіркелген қарасан ауруының орташа ошақтық көрсеткіші 1-ден 4 жануарға дейін болды, бұл қарасан инфекциясының аса жұқпалы еместігін көрсетеді. Осы жылдардағы Республика аумағында қарасанның пайда болу жиілігін зерттей келе, аурудың белгілі бір мерзімнен кейін қайталанып отыру жағдайы анықталынбады. Қарасан ошақтарының ай сайынғы динамикасын талдау ауру негізінен қазан және қараша айларында көбірек көрініс беретінін көрсетті. Индет ошақтары қыс айларында және ерте көктемде (желтоқсан, қаңтар, ақпан және наурыз) сирек кездеседі немесе мүлде тіркелмейді.

2010-2020 жылдар аралығында (11 жыл) Қазақстан Республикасының аумағында қарасанның таралуының жоғары деңгейі 3 облыста (Батыс Қазақстан, Шығыс Қазақстан, Жамбыл), орташа деңгейі 3 облыста (Алматы, Ақтөбе, Павлодар) байқалды, ал басқа 4 облыста (Қостанай, Атырау, Қарағанды, Ақмола) – қарасанның таралу деңгейі төменгі дәрежеде болды.

Анықталынған эпизоотологиялық көрсеткіштерді бағалау және ретроспективті талдау негізінде әрбір аймақтың қарасан ауруы бойынша індеттік ахуалын көрсететін эпизоотологиялық аудандастыру карталары әзірленді.

Біз құрастырған қарасан бойынша індеттік ахуалдың шиеленісу қарқындылығын көрсететін картаға сәйкес, 2010-2020 жылдар аралығында Қазақстан Республикасы аумағының 71,4% құрайтын 10 облысы территориясы қарасан ауруынан қолайсыз, ал қалған 4 облысы (28,6%) аумағы (Қызылорда, Солтүстік Қазақстан, Маңғыстау, Түркістан) бұл індеттен таза болып есептелінді.

Қазақстан Республикасы аумағындағы қарасанның індеттік жағдайының динамикасы туралы жинақталынған жаңа ғылыми мәліметтерді аурудың алдын алу шараларын жоспарлау мен жүргізу және жануарлар қарасанымен күресудің тиімді шараларын дайындау кезінде пайдалануға болады.

Кілт сөздер: инфекция; эпизоотология; қарасан; мониторинг; эпизоотиялық ошақ; эпизоотиялық жағдайдың шиеленісуі.