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DISTRIBUTION OF HORSES GLANDERS IN THE WORLD AND COUNTRIES BORDERING WITH KAZAKHSTAN РАСПРОСТРАНЕНИЕ САПА ЛОШАДЕЙ В МИРЕ И ПРИГРАНИЧНЫХ С КАЗАХСТАНОМ СТРАНАХ

Аннотация

Сап (malleus) - инфекционная болезнь лошадей, ослов, мулов и других непарнокопытных семейства лошадиных, характеризующаяся образованием специфических сапных узелков, склонных к некрозу. Сап вызывается бактериями вида *Burkholderia mallei*, может также передаваться человеку.

В республике в последние годы взят курс на увеличение поголовья лошадей. С этой целью выделяются большие инвестиции для приобретения племенного скота из стран ближнего и дальнего зарубежья. При этом существует угроза заноса особо опасной зоонозной болезни – сап из неблагополучных стран. В связи с этим изучение эпизоотической ситуации вспышек заболеваемости сапа лошадей представляет несомненный практический интерес.

Эпизоотическая ситуация по сапу лошадей в мире и республике были изучены путем анализа данных ветеринарной отчетности Комитета ветеринарного контроля и надзора МСХ РК (Министерство сельского хозяйства Республики Казахстан), а также по данным МЭБ (Международное эпизоотическое бюро).

Данные МЭБ за 10 лет свидетельствуют о циркуляции возбудителя в некоторых странах Восточной Европы, Азии и Африки, а также проведены литературно-информационный анализ и исследование по распространенности сапа лошадей в мире и приграничных с Казахстаном странах.

Тесные экономические связи Казахстана с соседними регионами и географическое расположение в центре Евразийского континента, выступающего в качестве трансграничного региона, сохраняют риск заноса возбудителя и возникновения вспышек сапа у лошадей в стране.

ANNOTATION

Glanders (malleus) is an infectious disease of horses, donkeys, mules and others hoofed animals characterized by the formation of specific nodules prone to necrosis. Glanders is caused by bacteria of the species *Burkholderia mallei*, can also be transmitted to humans.

In recent years, the republic has taken a course to increase the number of horses. That is the reasons for large investments are allocated for the purchase of breeding cattle from countries near and far abroad. At the same time, there is a danger of the introduction of a dangerous zoonotic disease – glanders from high-bacteria areas countries. In this regard, the study of the epizootic situation of outbreaks of equine glanders is of undoubted practical interest.

The epizootic situation of horse breeding in the world and the republic was studied by analyzing the veterinary reporting data of the Committee for Veterinary Control and Supervision of the Ministry of Agriculture of the Republic of Kazakhstan, as well as according to the OIE (The World Organization for Animal Health).

OIE data for 10 years indicate the circulation of the pathogen in some countries of Eastern Europe, Asia and Africa, as well as a literature and information analysis and a study on the prevalence of equine glanders in the world and countries bordering with Kazakhstan.

Kazakhstan's close economic ties with neighboring regions and geographical location in the center of the Eurasian continent, acting as a cross-border region, preserve the risk of introduction of the pathogen and the occurrence of outbreaks of glanders in horses in the country.

Ключевые слова: сап, лошади, мониторинг, маллеинизация, эпизоотическая ситуация
Keywords: glanders, horses, monitoring, malleinization, epizootic situation

Introduction. Glanders (malleus) is an infectious disease of horses, donkeys, mules and other of the equine family, characterized by the formation of specific glander nodules prone to necrosis. Glanders is caused by bacteria of the species *Burkholderia mallei*, can also be transmitted to humans [1, 2, 3].

Horse glanders has been known since antiquity, at all times it caused great economic and social damage. With a variety of clinical and pathological manifestations, lesions of various organs, glanders occupies a special place among chronic infectious diseases [4, 5].

But only in the second half of the XIX century the causative agent of glanders was discovered and the first diagnostic tools were created. The causative agent of glanders was discovered by the scientist Babesh in smears from pus and in histological sections from affected tissues, but he failed to isolate the culture. Subsequently, Leffler and Schutz isolated the culture of the glanders pathogen, studied its resistance in the external environment and pathogenicity for animals of various species [6].

The development, continuous improvement and implementation of a system of anti-seizure measures made it possible to localize and eliminate this disease in the regions of the former CIS.

Glanders for the first time in Kazakhstan was registered by the expedition of Professor Ostrovsky of the Kharkiv Veterinary School, who in 1853 noted this disease in the Bukeevskaya steppe. In Kazakhstan, there was an increase in the number of breeding horses allocated. This was largely due to the fact that there were more veterinary specialists and improved statistical accounting. Especially many sick animals were found in the first five months of 1914, when purchases of horses for the military department increased and their veterinary and sanitary examination was carried out, during which glanders were discovered.

Mallein was used extremely rarely to identify hidden forms of glanders. The veterinary organization of Kazakhstan only in 1931 received real opportunities to fight glanders. These opportunities appeared due to the collectivization of agriculture.

In 1932, horses were almost completely examined for glanders in the Pavlodar, East Kazakhstan, Semipalatinsk regions and in a number of the most disadvantaged areas of other regions adjacent to Western Siberia and Central Asia. In total, 375.5 thousand horses were clinically examined, 353.2 were malleinated, 21.8 were examined according to CFR, 35.2 thousand animals were re-examined and malleinated. In 1932, compared with 1928, 36 times more horses were malleinated in Kazakhstan, almost 2 times since 1931.

These works established that Kazakhstan at that time was one of the most disadvantaged regions of the Soviet Union back then. Employees of all soviet, party and economic enterprises were mobilized to fight glanders [7].

Horse glanders as an epizootic in Kazakhstan was eliminated by 1939, through the annual routine anti-glanders services. On the territory of Russia, glanders was eliminated in the late 50s of the XX century. But by now it is still preserved in the countries of the Middle East, Asia and other parts of the globe [8].

Data from the OIE (The World Organisation for Animal Health) for 2021 indicate the registration of the pathogen in some countries of Eastern Europe, Asia and Africa and the widespread spread of the disease in Myanmar, Mongolia, Pakistan, India, Indonesia, Southeast Asia and China. In 1990-1997 disease outbreaks was registered in Belarus and Latvia [9].

In some European countries, for example, in France, there are isolated cases of glanders in imported horses, which indicates the need for a thorough examination of all imported animals. Thus, the disease should, however, be studied in those countries where it has disappeared in order to prevent its re-introduction from other areas of the globe. With the development of market relations with foreign countries, there is a possibility of introduction of the pathogen glanders [10].

The research work carried out by us provides for the study of the epizootic situation of horse breeding in the territory of the republic.

The results of this work will make it possible to optimize antiepizootic measures to prevent and spread this disease among horses in the Republic of Kazakhstan.

Materials and methods of research. The epizootic situation of horse breeding in the world and the republic was studied by analyzing the veterinary reporting data of the Committee for Veterinary Control and Supervision of the Ministry of Agriculture of the Republic of Kazakhstan, as well as according to the OIE (The World Organisation for Animal Health).

Results of research. A literature and information analysis and research on the prevalence of horse glanders in the world and countries bordering Kazakhstan were carried out.

Horse glanders was once widespread in Europe, but with the introduction of measures to combat it, the incidence in most countries has steadily declined it is still found in Asia, Africa and South America, but is not found in the United States and Western Europe. In permanently dysfunctional farms (countries), a latent course of the disease prevails among the affected animals, in which not only there are no clinical signs, but also sometimes, a reaction to mallein temporarily falls out. This is especially true for semi-wild animals. A sharp change in the conditions of detention, inadequate feeding, increased exploitation, transportation of animals to other natural and climatic conditions (acclimatization) usually in such horses cause an exacerbation of the latent glanders, up to an obvious infection [11].

Table 1 – Distribution of horse glanders in the world (OIE data for 10 years).

№	Name of country	Year										
		2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
1	Afghanistan		+									
2	Brazil	+	+	++	+	+		+		+	++	+
3	Bahrain	+										
4	Guinea-Bissau							+		+		
5	Germany				+	+						
6	Hong Kong				++							
7	Eritrea									+		
8	Zimbabwe					+						
9	Iran	+	+			+	+	+	+	+	+	+
10	Iraq	++		++			++	++	++	++	++	
11	India	++	++	++	++	++	++	++	++			
12	China								+	+	+	+
13	Kuwait									+		
14	Mongolia								+			

15	Nepal											+	+
16	Pakistan	++	+	+	++	++							
17	Russia			+									
18	Turkey								+		+	+	
19	Ethiopia	++											
Note: + - the disease was registered 1 time a year; ++ - the disease was registered 2 times a year													

As seen from the table 1, glanders were detected in Brazil every year during 2011–2021, except for 2016 and 2018. In addition, in 2013 and 2020, it was detected 2 times a year [12]. In China, glanders were detected in recent years from 2018 to 2021 [13]. In Iraq, glanders were detected for 10 years, during 2011, 2013 and 2020. The disease was registered twice a year, except for 2014 and 2015, when outbreaks were not registered [14]. In Iran, outbreaks of glanders also recurred every year, except for 2013 and 2014 [15].

In India, from 2011 to 2018, outbreaks of glanders occurred almost 2 times a year [16]. In Turkey, outbreaks of glanders were observed in 2017, 2019 and 2020 [17].

Meanwhile, in Pakistan, outbreaks of glanders occurred twice a year in 2011, 2014 and 2015, and in 2012 and 2013. – once a year [18]. On the African continent, outbreaks of glanders were observed in 2011, in Ethiopia only in 2011, but 2 times a year, in Zimbabwe in 2015, in Guinea-Bissau in 2017 and 2019, in Eritrea in 2019 [19].

In Russia, an outbreak of glanders was detected only in 2013. On the European continent, there were outbreaks of glanders in Germany in 2014 and 2015. Meanwhile, in Hong Kong in 2014, outbreaks of glanders were observed 2 times a year. In eastern countries, outbreaks of glanders were reported in Bahrain in 2011 and Kuwait in 2019. Sources report that in 2011, horses imported from Syria through Kuwait were suspected of importing glanders [20].

In 2018, 4 cases of glanders of Arabian horses were analyzed in Mongolia. Affected animals had nasal discharge and multiple skin nodules on the hind limbs and abdomen. These horses were brought from

Russia three years ago at the age of 2-5 years. Other local Mongolian horses in herds did not show any clinical signs [21].

In recent 2020-2021, outbreaks of glanders have been observed in Nepal. Thus, we can note the latent course of the disease and the risk of importation from potentially prosperous areas. Visualization of the prevalence of glanders of horses in the world is presented in Figure 1.



Figure 1 – Distribution of glanders in the world (OIE data for 2011-2021)

According to statistics 1, all cases of the disease in the countries of Asia, South America and endemic countries of Africa should be noted, i.e., the annual registration of outbreaks of the disease, that measures to combat this disease are ineffective [3].

In our republic, there is a tendency to increase the number of horses; for this purpose, large investments are allocated for the purchase of breeding stock from the countries of near and far abroad. According to the Ministry of Agriculture of the Republic of Kazakhstan and the Statistics Committee of

the Ministry of National Economy of the Republic of Kazakhstan, by the end of 2021, the number of horses increased by 10.5%, amounting to 3.5 million heads. In this regard, the study of the epizootic situation of outbreaks of infectious diseases in horses, including glanders, is of undoubted practical interest [22,23].

Based on the existing risks, we conducted a regionalization according to the level of risk of bringing glanders of horses into our republic.



Figure 2 – Potentially dangerous countries for Kazakhstan in terms of glanders

Given the number of outbreaks over the past 10 years more than one time, the greatest danger is posed by such countries as Mongolia, China, India, Iraq, Iran, and Pakistan. Russia and Iraq have reported isolated cases, making those countries potentially the least at risk of infection.

An analysis of the current situation with glanders shows that the countries of Asia, America and Africa are endemic, that is, the annual registration of outbreaks of the disease indicates the ineffectiveness of measures to combat this disease.

All animals imported from known or potentially endemic areas should be checked regularly for glanders prior to importation. Retesting during quarantine is also recommended, as infected animals may be asymptomatic and serologically negative.

Close economic ties of Kazakhstan with neighboring regions and its geographical position in the center of the Eurasian continent, acting as a transboundary region; retain the risk of introducing pathogens and outbreaks of glanders in the country.

Conclusion. The epizootological characteristic of the country's territory by the glanders of horses over the past 10 years was determined. A literary-informational analysis and study of the prevalence of glanders of horses in the world and border countries with Kazakhstan was carried out. The epizootic situation for glanders of horses was studied by analyzing the data of veterinary reporting of the Committee for Veterinary Control and Supervision of the Ministry of Agriculture of the Republic of Kazakhstan, as well as according to OIE data.

An increase in the number of horses in the world and in our republic, the development of exports and imports, participation in equestrian competitions in the international arena can contribute to the importation of the causative agent of horse glanders and the spread of infection in our republic. Thus, the disease should also be studied in those countries where it has disappeared in order to prevent its re introduction from other areas of the globe.

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РЕЗЮМЕ

Сапа (Malleus) - очень опасная эпидемия, инфекционное заболевание, характеризующееся образованием специфических железистых узлов, склонных к некрозу, от которых болеют лошади, ослы, мулы и др. Мангольд вызывает бактерию *Burkholderia mallei* и также может передаваться человеку.

В последние годы в стране ведется курс по увеличению поголовья лошадей. С этой целью выделяются большие инвестиции в приобретение племенного скота из стран ближнего и дальнего зарубежья. При этом возникает риск попадания в особо опасное зоонозное заболевание – Сапа из неблагополучных стран. В связи с этим изучение эпизоотического состояния очагов Сапа лошадей, несомненно, представляет практический интерес.

Путем анализа данных ветеринарной отчетности Комитета ветеринарного контроля и надзора МСХ РК (Министерства сельского хозяйства Республики Казахстан), а также по данным МЭБ (Международного эпизоотического бюро) изучена эпизоотическая ситуация в мире и стране с коневодством.

Данные МЭБ за 10 лет свидетельствуют о неуклонном росте возбудителя в некоторых странах Восточной Европы, Азии и Африки, а также проведен литературный и информационный анализ и исследования о распространенности болезни сапа в мире и странах, граничащих с Казахстаном.

Тесные экономические связи Казахстана с соседними регионами и географическое положение в центре евразийского континента, выполняющего функции трансграничной зоны, сохраняют в республике угрозу проникновения возбудителей коневодческой болезни