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#### ANALYSIS OF THE EPIZOOTIC SITUATION OF BOVINE MORAXELLOSIS

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*The article presents an analysis of the epizootic situation of cattle moraxellosis in the territory of Kostanay region in breeding farms. The author studied the accounting documentation of the Kostanay branch of KazNIVI Research Veterinary Station LLP for 2019-2021 and analyzed the accounting and*

reporting documentation of breeding farms. The article discusses the veterinary and sanitary condition of livestock complexes that raise cattle of the Aberdeen-Angus breed. To determine the causes of eye lesions, bacteriological studies of flushes and microscopic studies of smears – prints obtained from cattle with clinical signs of keratoconjunctivitis were carried out. A bioanalysis was also carried out on laboratory animals. Laboratory tests were carried out in accordance with the approved guidelines. Based on the data obtained, the percentage of morbidity with moraxellosis in breeding farms was revealed. A literary review of the state of knowledge on this issue was conducted with the citation of articles from foreign and domestic journals. The publication presents the results of bacteriological studies, as well as identifies the most significant causes contributing to the emergence and persistence of problems with this disease.

*Keywords:* moraxellosis; *Moraxella bovi*; breeding farms; identification; epizootology.

### АНАЛИЗ ЭПИЗОТИЧЕСКОЙ СИТУАЦИИ ПО МОРАКСЕЛЛЕЗУ КРУПНОГО РОГАТОГО СКОТА

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Статья дает анализ эпизоотической ситуации по моракселлезу крупного рогатого скота на территории Костанайской области в племенных хозяйствах. Автором было изучена отчетная документация Костанайской «Научно-исследовательской ветеринарной станции» филиала ТОО «КазНИВИ» с 2019-2021 г и проведен анализ отчетной документации племенных хозяйств. В материале рассматривается ветеринарно-санитарное состояние животноводческих комплексов, выращивающие крупный рогатый скот породы Абердин – Ангус. Для установления причин поражения глаз были проведены бактериологические исследования смывов и микроскопические исследования мазков – отпечатков, полученных от крупного рогатого скота с клиническими признаками кератоконъюнктивита. Также была произведена биопроба на лабораторных животных. Лабораторные исследования проводили согласно утвержденным методическим указаниям. На основании полученных данных был выявлен процент заболеваемости по моракселлезу в племенных хозяйствах. Был проведен литературный обзор состояния изученности данного вопроса, с цитированием статей из зарубежных и отечественных журналов. В публикации приводятся результаты бактериологических исследований, а так же определены наиболее значимые причины, способствующие возникновению и сохранению неблагополучия по данному заболеванию.

*Ключевые слова:* моракселлез; *Moraxella bovi*; племенные хозяйства; идентификация; эпизоотология.

### ІРІ ҚАРА МАЛДЫҢ МОРАКСЕЛЛЕЗІ БОЙЫНША ЭПИЗОТИЯЛЫҚ ЖАҒДАЙДЫ ТАЛДАУ

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Мақалада Қостанай облысы аумағындағы асыл тұқымды шаруашылықтардағы ірі қара малдың моракселлезі бойынша эпизоотиялық жағдайға талдау ұсынылған. Автор 2019-2021 жылдарға арналған Қазғзви "ғылыми-зерттеу ветеринарлық станциясы" ЖШС Қостанай филиалының бухгалтерлік құжаттамасын зерделеп, асыл тұқымды шаруашылықтардың есептік құжаттамасын талдады. Мақалада абердин-Ангус тұқымды ірі қара мал өсіретін мал шаруашылығы кешендерінің ветеринариялық-санитариялық жағдайы қарастырылады. Көздің зақымдану себептерін анықтау үшін шайындыларды бактериологиялық зерттеу және кератоконъюнктивиттің клиникалық белгілері бар ірі қара малдан алынған жұғынды – іздерді микроскопиялық зерттеу жүргізілді. Сондай-ақ зертханалық жануарларға биосынама жүргізілді. Зертханалық зерттеулер бекітілген әдістемелік ұсыныстарға сәйкес жүргізілді. Алынған мәліметтер негізінде асыл тұқымды шаруашылықтарда моракселлезбен ауырғандардың пайызы анықталды. Шетелдік және отандық журналдардың мақалаларына сілтеме жасай отырып, осы мәселе жағдайына әдеби шолу жасалды. Басылым бактериологиялық зерттеулердің нәтижелерін ұсынады, сонымен қатар осы аурумен байланысты проблемалардың пайда болуына және сақталуына ықпал ететін маңызды себептерді анықтайды.

*Түйінді сөздер:* моракселлез; *Moraxella bovi*; асыл тұқымды шаруашылықтар; сәйкестендіру; эпизоотология.

**Introduction.** In cattle, conjunctivitis occurs as a result of exposure to mechanical, physical, chemical, infectious and invasive diseases.

Conjunctivitis can be a symptom of infectious diseases such as infectious rhinotracheitis of cattle, malignant catarrhal fever of cattle, parainfluenza-3, chlamydia, cowpox, infectious keratoconjunctivitis. In invasive diseases (telyaziosis) [1, p. 54].

Infectious bovine keratoconjunctivitis is the most common eye disease of cattle and is present in dairy and beef cattle populations worldwide [2, p. 254].

The cause of infectious keratoconjunctivitis may be microorganisms such as Chlamydia, Moraxella Bovis, Listeria monocytogenes and Mycoplasma species. The symptoms of infectious keratoconjunctivitis are presented in Table 1.

Table 1 - Clinical characteristics of various pathogens

The causative agent	Clinical features
Listeria monocytogenes	affects mainly the iris, does not lead to ulceration of the cornea
Mycoplasma	corneal opacity and roughness, conjunctiva edematous and reddened
Chlamydia	acute or chronic inflammation of the conjunctiva, swelling of the eyelids, severe narrowing of the eye slit, mostly calves are susceptible
Moraxella bovis и Moraxella bovoculi	lacrimation, photophobia develops, hyperemia of conjunctival vessels, blepharospasm, serous-purulent discharge from the eyes, as well as clouding and ulceration of the cornea

Infectious keratoconjunctivitis caused by Moraxella bovis is manifested by inflammation (single-sided or bilateral) of the conjunctiva, cornea, moderate lacrimation, then serous-purulent outflows from the nasal openings appear. Often animals are photophobic

Mainly cattle, small cattle, and according to some authors all kinds of animals are susceptible. There were also rare cases of the disease in horses, pigs and dogs that came into contact with sick animals, but the disease manifested sporadically

Any breed can be affected, but the incidence is higher in highly productive cattle breeds in both the meat and dairy industries [3, p. 65].

Moraxella bovis is considered to be the primary pathogen of the cornea, that is, which can attach to and penetrate the intact corneal epithelium. Moraxella bovis villi attach to the corneal epithelium and produce toxins, causing necrosis of the epithelium. In fact, Moraxella bovis is the only bacterium of veterinary significance that can cause corneal ulceration [4, p. 132].

It is known that in herds where there have not been outbreaks before, young and elderly animals are affected equally severely. Affected animals have unstable immunity, which becomes less effective after 1 or 2 years, which often leads to re-infection. The effectiveness of this immunity depends on the severity of the disease. Unfortunately, attempts to produce live or killed vaccines against Moraxella bovis were unsuccessful [5, p. 89].

Environmental factors such as dust, ultraviolet radiation, and the fly Musca fallalis (the distributor of eye diseases) are also an important part of the pathogenesis of this disease. The economic consequences of bovine moraxellosis are enormous, since the weight gain of cattle on feedlots is significantly reduced [6, p.12].

The diagnosis is established either by identifying the microorganism Moraxella, or if several animals in the herd have the same clinical signs, without identifying any other reason.

The purpose of the work is to identify the presence of strains of Moraxella bovis and Moraxella bovoculi in breeding farms breeding the Aberdeen – Angus breed in the Kostanay region.

**Materials and methods of research.** Monitoring studies of cattle that had clinical signs of infectious keratoconjunctivitis at different stages were carried out.

In order to identify eye diseases of agricultural animals, an analysis of the reporting documentation of the Kostanay "Scientific Research Veterinary Station" of the KazNIVI LLP branch from 2019-2021 on the issue of epizootic well-being of the Kostanay region in infectious terms was carried out. The reporting documentation in breeding farms has also been studied. (Journal for registration of animal diseases)

Flushes from the affected eyes of agricultural animals from the following breeding farms were selected: "Terra", "Prirechenskoye", "Kolos Firm", peasant farm "Seidakhmetov E. S.", "Agrotechnological Company", "Sever-Agro", "Nurzhalau NS".

The biomaterial was taken according to the rules of collection and transportation of biological materials for laboratory research.

Bacteriological studies were performed at the Department of Veterinary Sanitation of the V. Dvurechensky Agricultural Institute.

Bacterial sowing of the obtained pathological material was carried out on nutrient media of blood meat-peptone agar, meat-peptone broth with further bacterioscopy (identification of the causative agent of the disease). Gram staining of smears - prints was carried out for microscopic examination [7, p.14].

A bioassay was also performed on laboratory animals. White mice were used to perform a bioassay. The prepared material was injected into animals subcutaneously, observing the rules of asepsis.

The diagnosis of keratoconjunctivitis caused by moraxella was made based on the results of microscopic examination of smears taken from the surface of the affected conjunctiva and bacteriological studies at an early stage of infection.

**Research results.** According to the analysis of the accounting documentation of the Kostanay "Scientific Research Veterinary Station" branch of KazNIVI LLP, nine regions of the republic have been identified over the past three years, where 11,738 cattle were infected, with an average incidence of 39.98%.

Cases of cattle disease are observed in Akmola, West Kazakhstan, East Kazakhstan, Karaganda, Kostanay, Kyzylorda, Mangystau, North Kazakhstan, Pavlodar regions.

It was also found that 6646 heads of Aberdeen - Angus cattle were imported to Kostanay region, of which 2658 heads were affected by moraxellosis. Over the past three years, according to official statistics, the percentage of infection was 39.9%.

As can be seen from Table 2, an analysis of farms that are at risk for moraxellosis, raising Aberdeen – Angus cattle in the Kostanay region, was carried out.

Table 2 - Availability of breeding farms by Aberdeen - Angus breed in Kostanay region (2021)

№	Name of the farms	District	Name of rural county	Breed	Availability of breeding stock (heads)
	«Nurzhalau NS» LLP	Arkalyk city	Matrosovo v.	Aberdeen-Angus	1262
2	«Sever Agro» LLP	Karabalyk	Burli v.		4295
3	«Agrotechnological Company» LLP	B.Maylin	Smailovka v.		510
4	P/F «Seidakhmetov E. S.»	Kostanay	Alzhanka v.		1378
5	«Kolos Firma» LLP	Denisov	Sverdlovka v.		395
6	«Prirechenskoe» LLP	Denisov	Prirenchenka v.		162
7	«Terra» LLP	Karabalyk	Nadezhdinka v.		2753
Total					10755

The situation was studied in 7 farms of various forms of ownership, under different conditions of maintenance located on the territory of Kostanay region, namely Karabalyk, Denisovsky, Kostanay districts, B.Mailina district and the city of Arkalyk.

The livestock farm of Nurzhailau NS LLP is located in the village of Matrosova, Arkalyk. Nurzhailau NS LLP grows beef cattle. The maintenance of animals is loose. The territory of animal husbandry is fenced. Feeding animals with juicy and coarse feeds - hay, straw, haylage and grain waste. The food supply is satisfactory. The water supply is centralized.

Veterinary and sanitary condition of the examined object: there is one entrance and exit, there is no barrier and sanitary inspection. Manure is removed and stored in winter on the farm by tractors, in summer it is exported to the fields of the farm.

Insecticidal treatment of animals is not carried out during the period of pasture keeping of cattle.

The livestock complexes of Sever-Agro LLP and Terra LLP are located in the Karabalyk district.

The territory of the complexes is closed to outsiders. There is a sanitary inspection, a barrier. Feeding of animals – in open pens. Farms have 18 wells. The pastures around the perimeter are fenced with barbed wire.

Rooms for animals of open content, three hangars for young animals. There are no heat carriers, there is no supply and exhaust ventilation system. Once a year, in the summer, the territory is disinfected. Cleaning and washing of animals is not carried out, walks - in summer the animals are on pasture, in winter the animals are on walking grounds, cards.

Livestock complex "Seidakhmetov E. S." the territory is fenced around the perimeter with barbed wire. There is an acute shortage of qualified veterinary specialists.

Sanitary cleaning of slaughterhouses is not carried out at the proper level. Manure from livestock premises is not exported on time.

Veterinary and sanitary condition of the examined object: there is one entrance and exit, there is no barrier and sanitary inspection. Disinfection of places where sick animals are kept is not carried out properly and with subsequent quality control of disinfection.

There are two breeding farms in the Denisovsky district that grow Aberdeen - Angus cattle, Kolos Firm LLP and Prirechenskoye LLP. The maintenance and feeding of animals corresponded to zootechnical norms and requirements.

Livestock farm LLP "Agrotechnological Company", located in the area of B.Maylin in 2021, the livestock is: cattle - 510 heads. The territory is fenced around the perimeter.

Veterinary and sanitary condition of the examined object: there is one entrance-exit, a barrier and a sanitary inspection. During the period of pasture keeping of cattle, insecticidal treatment of animals is carried out. Veterinary and sanitary measures were carried out according to the established plan. The manure is removed by a conveyor and taken to the manure storage, ventilation is supply and exhaust.

According to the reporting documentation of these farms (the Journal for the registration of sick animals), it was found that from 5% to 10% of the animal population have pronounced clinical signs of infectious keratoconjunctivitis.

Preliminary diagnosis for moraxellosis of Aberdeen - Angus cattle. it was established on the basis of the obtained clinical, epizootological data. During the study of the logs of the clinical examination, the data of breeding farms, the following clinical signs were found: photophobia, corneal erosion, acute conjunctivitis and purulent discharge from the eyes.

In the peasant farm "Seidakhmetov E. C" revealed two heads of cattle with deep ulceration of the eyes, which also indicates infectious keratoconjunctivitis.

Eye diseases were detected mainly in young animals, aged from three weeks to a year.

Based on the obtained research results, an analysis of the epizootic situation was carried out, according to the disease, moraxellosis of cattle, among breeding farms of the Kostanay region (previously not registered in Kazakhstan).

In the process of bacteriological studies, 73 samples of pathological material were analyzed, of which 48 samples were isolated cultures of the causative agent of this disease. Round, flat, gray-white colonies were formed on blood meat-peptone agar, with a characteristic zone of complete hemolysis.

According to the totality of morphological and cultural properties, the bacteria isolated by us from the pathological material of the affected eyes of cattle correspond to the characteristics of the genus Moraxella and the species of bacteria Moraxella bovoculi and Moraxella bovis.

Moraxella is an acid-resistant, gram-negative rod-shaped bacterium.

Evaluation of the results of the bioassay. The result of the bioassay is positive, as it was observed after the introduction of the test material, on the second day, an increase in body temperature, lack of appetite, depression, and on the third day the laboratory animals died.

The results of bacteriological studies on pathological materials are shown in Table 3.

Table 3 - Research results

№	Name of the farms	Number of samples taken	Number of positive samples
1	«Nurzhalau NS» LLP	8	8
2	«Sever Agro» LLP	9	9
3	«Agrotechnological Company» LLP	13	-
4	P/F «Seidakhmetov E. S.»	20	20
5	«Kolos Firma» LLP	7	-
6	«Prirechenskoe» LLP	5	-
7	«Terra» LLP	11	11
Total		<b>73</b>	<b>48</b>

Breeding stock in the "Seidakhmetov E. C" peasant farm in the Kostanay district of the village of Alzhanka is 1378 heads, according to research, 1.5% of the herd is infected with this disease.

The livestock of Nurzhailau NS LLP, Arkalyk, Matrosovo village, is 1262 heads of cattle, the incidence rate was 0.63%.

Sever-Agro LLP, located in the Karabalyk district, Burli village, has 4,295 cattle. In this breeding farm, the incidence rate was 0.20%.

The percentage of morbidity in Terra LLP in the Karabalyk district was 0.4% of the total livestock.

The diagnosis of moraxellosis was not confirmed in the following breeding farms: Agrotechnological Company LLP, Kolos Firm LLP, Prirechenskoye LLP.

Conclusion. Good management practices are necessary to reduce or prevent the spread of infection. It is necessary to separate sick animals from healthy ones.

Ultraviolet radiation from sunlight can exacerbate the disease, so sick animals should be provided with shade. It is necessary to carry out preventive disinfection to reduce the number of flies, which can help reduce the spread of the disease.

The disease was most often manifested among young animals that are kept in feedlots with a high density of livestock.

The absence of regulatory documents on measures to combat and eliminate this contagious disease, the import of breeding cattle from Western Europe, the presence of hidden carriers of the pathogen, all this led to the appearance of foci that are permanently unfavorable for infectious keratoconjunctivitis.

Moraxellosis (infectious keratoconjunctivitis) of cattle of Kostanay region is not registered according to statistical data of veterinary organizations. In many farms, symptomatic treatment is carried out according to the treatment scheme for an eye disease - telyaziosis.

Recommendations were given to breeding farms and for the treatment and prevention of this disease. An explanatory conversation was also held about measures to combat infection, since the high incidence of cattle leads to incredible economic damage, due to the culling of animals, a significant decrease in dairy productivity and weight gain in cattle. Another reason for economic damage is the deterioration of animal feeding, which negatively affects the quality reproduction of the herd.

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