РАЗДЕЛ IV. ВЕТЕРИНАРИЯ

Ikimbayeva N.A.¹, Duysssembaev S.T.¹, Shabdarbayeva G.S.²
Dissemination of the hypodermatosis of cattle in different natural and climatic regions of the East Kazakhstan region

¹ *Shakarim State University of Semey
(Russia, Semey)*

² *Kazakh National Agrarian University
(Russia, Almaty)*

doi 10.18411/scc-05-2018-10

idsp 000001:scc-05-2018-10

Abstract

The article presents the results of the scientific researches conducted in the conditions of the farms of the East Kazakhstan region. The distribution of the cattle hypodermatosis has been studied. It has been determined that in the East Kazakhstan region, the indicators of the extension of the gadfly invasion varied within the range of 30.0% -62.1% with the intensity of the invasion of 15.4-24.0 specimens of larvae per animal. Pathogens of the hypodermatosis of cattle in the region are two types of gadflies, *Hypoderma bovis* and *Hypoderma lineatum*. The species of *Hypoderma bovis* is widespread everywhere. It is established that the young cattle are affected in greater numbers and with a higher level of intensity of the gadfly invasion in comparison with adult animals.

Key words: hypodermatosis, epizootology, extensity, intensity, daily activity, species composition, seasonal dynamics

Introduction. The President N.A. Nazarbayev in his Address to the New Opportunities for the Development of the Fourth Industrial Revolution of January 10, 2018 pointed to the need of solving a number of problems, saying that Kazakhstan has everything it needs to join the ranks of the new world leaders. One of them is "Smart technology" - a chance for a breakthrough in the development of the agricultural and industrial complex.

In this regard, the formation of competitive agricultural and industrial production, promoting food security of the country has to be based on highly skilled highly effective innovative technologies.

The main goal of the agricultural and industrial complex is to produce livestock products of the highest quality, primarily for the realization of the food problem. And it is important to improve further the livestock production in improving the welfare of the population [1].

Agriculture is the leading industry in Kazakhstan. But in order to receive qualitative products, it is necessary to create certain conditions for animals. There are various diseases of cattle. Diseases are a threat not only to the productivity of animals, but also to life. Recently, in Kazakhstan, a severe epizootic situation has occurred on the hypodermatosis of cattle, which has become widespread in almost all regions of the country, especially in the eastern regions.

Hypodermatosis is a chronic disease of cattle caused by larvae of the hypodermic gadfly characterized by inflammatory phenomena in their habitats, general intoxication of the organism, a decrease in milk, meat productivity of animals and the quality of rawhide [2,3,4,5].

It is important to note that the larvae migrate through the body and lead to a decrease in an additional weight. They enter the esophagus or the spinal cord. When migrating into the esophagus it blocks and disrupts the functions of digestion. But even these actions of larvae

can be called "weak", because when they get into the spinal cord they cause painful pain and paralysis [3].

Gadflies are holometabolic insects. In their development they pass through phases: eggs, larvae, pupae and imago. The output of imago gadflies from pupae occurs very rapidly - within 2-3 seconds and after 30-60 seconds the fly is capable of flying and multiplying. After pairing, the females immediately go in search of animals to lay eggs. Formation of larvae inside the egg continues at line 3-7, in the esophagus - 3-6 days. The larvae hatched from eggs penetrate the host's body. Later, larvae of the 1st stage of the string migrate along the large vessels and nerves to the spine and through the intervertebral openings enter the adipose tissue of the spinal canal, and larvae of the I stage of the esophagus migrate towards the esophagus and are localized in its submucosa. Larvae of the II and III stages, from the esophagus and spinal canal migrate to the area of the back and waist, where connective tissue capsules are formed. For further development they need oxygen of atmospheric air, for which they form fistulous openings in the skin. After the formation of the fistula, the larvae molt and pass into the III stage. The matured larvae of the III stage go out of the capsule through the fistulous openings in the skin and fall to the ground where they pupate. The development of pupae with a temperature fluctuation in the range of 10-21 ° C and relative humidity of 60-80% continues for 1-1.5 days.

Hypodermatosis has been studied in veterinary science by many scientists. Among them Kunichkin G.I. [2], Shabdarbayeva G.S., Akhmetova G.D., Turganbaeva .E., Balgimbayeva A.I. [3], Iskakov M.M., Duyssymbaev S.T. [4], Vatsayev Sh.V. [6], Yamov V.Z. [7].

The aim of the research: determination of the spread of hypodermatosis of cattle in different natural and climatic zones of the East Kazakhstan region (EKR).

The main objectives of the work:

To study the species composition and peculiarities of the spread of the hypodermatosis of cattle.

To study the dates of flight of gadflies, the dynamics of the approach of larvae to the skin of animals.

The results of the research. In the Republic of Kazakhstan two types of gadflies were identified : *Hypoderma bovis*, De Geer - ordinary subcutaneous gadfly (string) and *Hypoderma lineatum*, De Villers - southern subcutaneous gadfly (striped ox warble fly). The first is widespread in all climatic zones of the republic, the second is more often found in lowland and foothill zones at an altitude of 500 meters above sea level. The development of clinically pronounced signs of hypodermatosis (the formation of larval nodules) in invasive animals in different natural and climatic zones of the Republic of Kazakhstan takes place at different times.

We conducted researches on the basis of five farms from different districts of the region on studying the biological characteristics of the activator of hypodermatosis, depending on the degree of radiation contamination and the difference in climatic conditions. We paid attention to the developmental times of larval phases of causative agents of hypodermatosis of cattle, the terms of their mass approach to the back of the animal, took into account the dates of pupation and the periods of intensive flight of adult gadflies in various natural and climatic zones of the East Kazakhstan region. The farms are located in different zones of radiation contamination: from the minimal radiation contamination (district of Tarbagatai , village of Kokzhyra) to the extreme risk zone (Abai district). The results are shown in Table 1 and in Figures 1, 2.

The results of the veterinary report on the prevalence of cattle by subcutaneous gadfly larvae on the districts in the East Kazakhstan region for 2015 – 2018 demonstrate that animals sick with hypodermatosis are registered almost in all areas of the region.

The results of the research were identified in five different farms of the East Kazakhstan, five different climatic conditions and five different radiation-hazardous zones at the former Semipalatinsk Test Site.

In the Law of the Republic of Kazakhstan dated December 18, 1992 "On the Social Protection of the Citizens Affected by Nuclear Tests at the Semipalatinsk Nuclear Test Site" five zones of radiation risk have been identified, depending on the magnitude of the dose of pollution of the territories.

The first is the zone of extreme radiation risk (above 100 rem).

The second is the area of maximum radiation risk (from 35 to 100 rem).

The third is the zone of increased radiation risk (from 7 to 35 rem).

The fourth is the zone of minimal radiation contamination (from 0.1 to 7 rem).

The fifth is a territory with preferential social and economic status (not less than 0.1 rem).

District of Abay is the area in the west of the East Kazakhstan region. It is located at a foot of Mountains Chingiztau to the southwest from Semey. The climate is sharply continental. The average temperature in January is -15.5°C , in July is 20.5°C . The volume of annual rainfall is 250-300 mm. Abay district belongs to a zone of extreme risk.

Beskaragai district is the area in the north-west of the East Kazakhstan region. The climate is continental. The average temperature of January is 17°C , July is 20°C . The annual amount of precipitation is 250-300 mm. Beskaragai district is located in the dry steppe subzone on the right bank of the Irtysh River. The territory of the region is directly adjacent to the Semipalatinsk nuclear test site zone and belongs to the zone of maximum radiation risk.

LLP of "Agricultural Firm "Prirechnoye" of suburban district of Semipalatinsk town is located on the left bank of the Irtysh River in 15 km from the town Semipalatinsk, of the East Kazakhstan region. The climate of the land use of the farm is sharply continental. Dry hot summer and cold winter with an average monthly low of 19.8°C to -40°C in January and a maximum of $+40.3$ degrees in July. A characteristic feature of this region is a sharp drop from warm to cold and vice versa. The territory of the district belongs to a zone of increased radiation risk.

Kokzhyra is a village in the Tarbagatay district of the East Kazakhstan region. The village is located in the southeast of the East Kazakhstan region between the Tarbagatai Ridge in the south and the Zaisan hollow in the north. The climate of the region is sharply continental. The average temperature in January is -17°C , -19°C , July is 20°C , 22°C . The village of Kokzhyra belongs to the zone of minimal radiation contamination.

The village of Makanchi of the Urdzhar district is located in the south-eastern part of the region on the southern slopes of the Tarbagatai Mountains. In the natural and climatic relation, the village of Makanchi of Urdzhar district is a unique region with bright natural contrasts. It is surrounded by the vast open space of dry steppes and a mountain taiga landscape. The village of Makanchi belongs to the zone of minimal radiation contamination.

The time of development of larval phases of pathogens of hypodermatosis in different natural and climatic zones of the East Kazakhstan region (tab. 1)

Table 1

Stages of development of hypodermic gadfly	Peasant farm of "Nariman" of Abai district	Peasant farm of "Balke" of Beskaragai district	"Agricultural Firm " Prirechnoye " of Semey town	Co-operative "Kozhyra" of Tarbagatay district	Peasant farm of "Birlestik" of the Urdzhar district
The approach of larvae to the back of an animal	November-April	November-May	December-April	December-May	November-May
Mass approach of larvae to the back	March	March-April	April-May	March-April	April-May
Loss of larvae	April	April-May	April-May	April-May	March-April
Intensive flight of gadflies	May-September	April--October	May-November	May- October	May-November

The dynamics of the approach of larvae of subcutaneous gadflies to the back surface of cattle of different age groups and the terms of their appearance on pupation are clearly shown in Figures 1 - 2.

It was established that the development of pupae formed from larvae that left for pupation in March-April is slower (for 4-5 weeks) than pupae, whose metamorphosis occurred in the summer.

Loss of the formed larvae for pupation in the lowland, foothill and mountain zones occurred, respectively, from March to May, from April to May, and from April to June.

It should be noted that the levels of extensiveness and intensity of cutaneous and gadfly invasions to some extent depend on the timely conduct of a complex of measures against gadflies, natural and climatic conditions, the specificity of animal husbandry and the characteristics of keeping animals.

Figure 1 – Dynamics of the approach of larvae of hypodermic gadflies to the back surface of adult cattle in different zones of the East Kazakhstan region

Figure 2 – Dynamics of loss of larvae of hypodermic gadflies in adult cattle in different zones of the East Kazakhstan region

During the research it was established that a complex of therapeutic and prophylactic measures, which is carried out by the veterinary service of the republic on a regular basis, including the systematic use of endoectocides - drugs with high insectic acaricidal and nematicidal activity, has a significant influence on the extensiveness and intensity of skin and gadfly invasion.

The indicators of the extent and intensity of skin and gadfly invasion of cattle in the Republic of Kazakhstan are subjected to significant fluctuations. The degree of infestation of cattle by the larvae of the hypodermic gadfly is inversely related to the age of the invaded animals. It has been established that young cattle are more affected in comparison with adult animals. In these animals, a higher level of intensity of gadfly invasion is also registered (Table 2).

Extensiveness and intensity of skin and gadfly invasion in untreated animals kept in different natural climatic zones (tab. 2)

Table 2

Natural and climatic zone	Researched animals							
	At the age of up to two years				At the age of over two years			
	Total investigated	Infested	Extensiveness of invasion, %	Intensity of invasion, specimen.	Total investigated	Infested	Extensiveness of invasion, %	Intensity of invasion, specimen.
Peasant farm of "Nariman" of Abai district	33	12	36,3	23,2	41	8	19,5	11,2
Peasant farm of "Balke" of Beskaragai district	20	8	40,0	20,4	25	4	16,0	9,5
"Agricultural Firm "Prirechnoye" of Semey town	10	5	50,0	18,7	30	6	20,0	12,5
Co-operative "Kokzhyra" of Tarbagatay district	37	23	62,1	24,0	35	7	20,0	15,5
Peasant farm of "Birlestik" of the Urdzhar district	20	7	35,0	15,4	22	9	40,9	8,7
Total:	24	11	44,68	20,34	30,6	6,8	23,28	11,48

It should be noted that the levels of extensiveness and intensity of skin and gadfly invasions to some extent depend on the timely conduct of a complex of measures against gadflies, natural and climatic conditions, the specificity of animal husbandry, care, feeding, keeping animals and their age.

Conclusion.

Thus, as a result of the conducted researches it was established that in the East Kazakhstan region the indicators of the extensiveness of the gadfly invasion depend on the degree of radiation contamination and the difference in climatic conditions.

The extensiveness of invasion varied within of 30.0% -62.1% with the intensity of invasion - 15.4 - 24.0 specimens of larvae per animal.

The activator of hypodermatosis of cattle in the region are two types of gadflies, Hypodermabovis, DeGeer and Hypodermalineatum, DeVillers. The species of Hypodermabovis is widespread everywhere. The widespread distribution of pathogens of hypodermatosis is promoted by high ecological plasticity of parasites, which allows them to adapt to constantly changing environmental conditions.

1. The Message of the President of the Republic of Kazakhstan from 10.01.2018.
2. Kunichkin G.I. - Subcutaneous gadflies Diptera, Hypodermatidae of cattle and the rationale for methods of fighting against them in the south and southeast of Kazakhstan: Abstract of Diss. for the degree of

- candidate of biological sciences. (03.098) / The All-Union scientific-research Institute of Veterinary Sanitation. - Moscow: , 1970. - 19 p.
3. Shabdarbayeva G.S, Akhmetova G.D, Turganbaeva G.E, Balgimbayeva A.I.- Practical training in parasitology (Arachnoentomology) .- Textbook .// Almaty, S-Print, 2012, 56 p.
 4. Iskakov M.M., Dyusembaev S.T. - Prevention and treatment of invasive diseases of farm animals and birds. - Almaty, 2006. 175 p.
 5. Gullan P.J., Cranston P.S. - The Insects: An Outline of Entomology, 5th Edition Wiley-Blackwell, 2014. - 624 p.
 6. Vatsayev Sh.V. - Hypodermatosis of cattle (epizootology, species composition, population ecology) and development of measures of fight against it in the Chechen Republic: monograph / Sh. V. Vatsaev. - Grozny: Publishing house of the Chechen State University, 2011. - 102 p.
 7. Yamov V.Z. Hypodermatosis of cattle / V. 3. Yamov // Veterinary Medicine. 2015. - No 4

Zainettinova D.B.¹, Julianov M.N.², Mukhamadiyeva N.N.¹
Etiology of mastitis in cows

¹ *Shakarim State University of Semey
(Russia, Semey)*

² *Kazakh National Agrarian University
(Russia, Almaty)*

doi 10.18411/scc-05-2018-11

idsp 000001:scc-05-2018-11

Abstract

The article examines the research on the etiology of mastitis in cows. Mastitis is a widespread disease of dairy cows. Diagnostic tests were performed to study the extent of mastitis spread in lactating cows. The main reason for the destruction of dairy cows with mastitis is not the benign feeding affected by mold fungi. Tests of feeds were selected to detect the level of contamination by microorganisms.

Key words: milk, mastitis, microorganisms, etiology.

The quality of the produced milk is affected by the sanitary condition of farms, the presence of cows, sick with mastitis and endometritis, the state of the technology of primary processing and storage of milk [1,2,3,4].

Due to inflammation of the udder, the productivity, sanitary quality of milk decreases, premature culling of cows due to hypothalaxia and atrophy of the udder occurs, the disease incidence of newborn calves increases (V.A. Parikov, 1990; N.G. Gasanov, 1990; L.D. Demidova, 2002; L.G. Roman, 2010; A.M. Semivolos, 2013; A.Ya. Batrakov, 2014; N.T. Klimov, 2014; Avdeenko, 2009, 2015).

The resistance of cows to mastitis is of great importance for obtaining high-quality milk [5,6].

In the emergence and spread of diseases of the mammary gland in cows, factors that reduce the resistance of the mammary gland and the organism as a whole play an important role (N.A. Sapozhnikova, 1992; V.I. Slobodyanik, 1994-2000; I.A. Rodin, 2002) on the background of which the pathogenic and conditionally pathogenic microflora manifests its action (V.M. Kartashova, A.I. Ivashura, 1988; V.M. Ivchenko, 1991; G.N. Kuzmin, 1995; V.M. Bagmanov, 2005; S. Janossi, Z. Baltay, 2004; D.P. Berry, 2005; V.S. Avdeenko, 2009; V.N. Filpot, Sh.S. Nickerson, 2012).

Much depends on keeping of animals in primary farms, unsatisfactory condition of which leads to contamination by pathogenic microorganisms in the process of milking.

The most significant climatic factors that affect the composition and properties of milk are the temperature and humidity of the air. Violations of the microclimate parameters reduce milk yield and the mass fraction of fat in milk [7].