ISSN: 0975-8585

Research Journal of Pharmaceutical, Biological and Chemical Sciences

Ecological-Epizootical Situation On Telasiosis Among Large Cattle In Northern Ural Region.

Larisa Aleksandrovna Glazunova[1], Yuri Valerievich Glazunov[2], and Abduvahob Ahrorovich Ergashev[3].

[1]Candidate of veterinary sciences, associate professor, sciences, researcher ASRIVEA – Branch of Tyumen Scientific Centre SB RAS, FSBEI HE Northern Trans-Ural SAU
[2]Candidate of biological sciences, associate professor, ASRIVEA – Branch of Tyumen Scientific Centre SB RAS
[3]Candidate of veterinary sciences, researcher ASRIVEA – Branch of Tyumen Scientific Centre SB RAS

ABSTRACT

The purpose of the study was the monitoring of cattle morbidity by telasiosis in various natural and climatic zones of the Northern Ural region (Russia) during the period from 2002 to 2016. A widespread distribution of telasiosis among cattle was determined in the Northern Ural region. Monitoring studies have made it possible to identify the causative agents of telasiosis in the region - Th. gulosa and Th. skrjabini. It was established that the invasiveness of livestock by telasiosis was characterized by fluctuating indices. So, in different natural and climatic zones the peaks of telasiosis invasion coincided, which were observed in 2003, 2005, 2010, 2012 and in 2016. A minimal extent of invasion was recorded in all sub-zones of the study during 2004, 2009 and 2011. Knowledge of the reasons concerning the peaks and the recessions of telasiosis invasion synchronicity will allow to develop preventive measures rationally.

Keywords: telasiosis, cattle, clinical manifestation, Northern Ural region, Thelazia.

Corresponding author

ISSN: 0975-8585

INTRODUCTION

The Tyumen Region is an integral part of the Northern Ural region and is one of the three regions of Russian Federation in terms of occupied area. The peculiarity of the region is that it is the only one in Russian Federation, it extends (together with autonomous regions) from the Arctic Ocean in the north to the state border with Kazakhstan in the south [18]. Such a location of the region favors the species diversity of fauna in the region, including parasitic one [3,6-8,14-16]. Currently, the Tyumen region is leading one on economic growth among the regions of the country, a special attention in the sanction conditions is paid to a strategically important direction - the development of the agricultural complex. The number of cattle, both dairy and meat, is constantly increasing in the region [17]. The technologies of keeping these animals are significantly different from each other. Thus, dairy animals are mainly stalled and spend most of their time indoors, so the impact of the biotic factors of the environment on them is very low, including the intermediate hosts of the telasites - zoophilic flies. In the meat sector, on the contrary, they spend half a year (from April to October) grazing on pastures and is attacked by zoophylic flies, which contributes to their invasion by telasiosis [9]. Nowadays, the territory of the region is grazed about one hundred thousand heads of cattle, twenty thousand of which are meat cattle.

Cattle telasiosis is a helminthic disease caused by nematode parasitizing (the suborder Spirurata, the family Thelaziidae) [1,6]. The telosia are the parasites in the ducts of the lacrimal gland, in the tear-nasal canal, under the third eyelid and in the conjunctival sac. The disease of animals with telasiosis is manifested in the form of conjunctivitis, keratoconjunctivitis and corneal ulcer [1,6,12]. The appearance of telasiosis reduces all types of cattle productivity of cattle. Moreover, during an untimely treatment, the animals lose sight and are discarded from a herd prematurely [7,8].

Do not forget about the probability of human disease with telasiosis, such cases are recorded in different parts of Europe, Asia and North America, and the causative agents of this invasion among humans are not only Thelazia callipaeda (dog parasite), but Th. californiensis and Th. gulosa [2,4,5].

The aim of the research was to study the distribution of telasiosis and species composition of telosia in the agricultural zone of the Northern Ural region.

STUDY MATERIALS AND METHODS

Cattle breeding in the Northern Ural region is widespread mainly in two climatic zones - sub-boreal forest and forest-steppe. The sub-boreal forest subzone occupies the area of 60-80 km along the southern boundary of the southern taiga subzone and it is a transitional zone to the forest-steppe by natural conditions and by soil cover. It borders with the Sverdlovsk region on the west, which is a major industrial center, and with the Omsk region in the east. The sub-boreal forest subzone includes the main part of Nizhnetavdinsky and Yarkovsky region, as well as Yurginsky, Aromashevsky, Sorokinsky and Vikulovsky region. The area of the subzone is relatively small - 2.4 million hectares, or 14.6% of the southern territory of the Tyumen region [11]. The climate of the subzone is moderately warm and well moisturized. Sub-boreal forest subzone has relatively little rainfall - 400-450 mm per year, of which about 350 mm take place during a warm period. Despite a small amount of precipitation, the soils in this subzone are over-moistened during summer. This is due to low permeability of the parent rocks and a deep soil freezing. The climate in the subzone, as well as throughout the entire area is continental one. Average temperatures: January - 19 °C, and July - from +17 to 19 °C. The amount of precipitation is 200-600 mm per year. Perennially frozen rocks are widespread in the north. Vegetation period makes 50-162 days [10].

The forest-steppe zone of the region is located to the south of the taiga and extends from east to west by 400 km, covering the area of 58.3 thousand m2 [11]. In this zone two subzones are distinguished on the territory of the region: the northern and southern forest-steppes, which have significant climatic differences. So, the subzone of the northern forest-steppe is characterized by a relatively warm climate and moderate moistening. Periodic (atmospheric) droughts, sometimes quite intense ones, are typical for this subzone. The subzone is composed of a large group of regions located along the Trans-Siberian Railway and to the south of it. Our studies were carried out in Golyshmanovsky, Isetsky, Ishimsky, Omutinsky, Tyumen, Uporovsky and Yalutorovsky regions.

The subzone of the southern forest-steppe is located in the very south of the agricultural territory of the region and borders on the Kurgan region and the Republic of Kazakhstan. The climate in the subzone is warm, humidification is inadequate, atmospheric droughts are recorded quite often [10,11]. The composition of the southern forest-steppe includes four regions - Armizonsky, Berdyuzhsky, Kazansky and Sladkovsky.

In order to study the spread of telasiosis among cattle, a clinical examination of animals owned by 35 agricultural enterprises, as well as the examination of livestock from personal subsidiary plots was performed during the summer period of 2002-2016. During this time, 25,009 cattle were examined. For the reliability of the obtained results, they examined only the cattle not exposed to insecticidal treatments. In order to confirm the diagnosis, we conducted microscopically examined flushes from the conjunctival cavity. To do this, the animal was fixed, the irrigation of the conjunctival eye sac from the syringe was carried out with a warm isotonic solution (28-30 °C) in the amount of 80-100 ml per eye. For a better wash, the tip of the syringe was moved from the inner corner of the eye to the outer corner of the eye at the time of irrigation. The solution was collected in cuvettes, poured into test tubes or beakers and settled for 10-15 minutes. The top layer was poured away, and the bottom one was centrifuged. The resulting precipitate was examined under the microscope at the magnification of 8-10 times. The processing of the data obtained with the inclusion of helminths was carried out using the extent of invasion (EI). The results were processed statistically [13] taking into account the mean values, their errors and the level of reliability (P) by Student on a computer using Microsoft Excel and "Biostat" program. This work was supported by the Basic Research Program of the Russian Academy of Sciences, Project IX. 135.2.3.

STUDY RESULTS AND THEIR DISCUSSION

The analysis data on the infestation of cattle by telasites are needed to assess and predict the incidence of telosiosis and to plan preventive measures. They did not perform long-term monitoring of cattle telasiosis before, therefore, the factors that could influence the spread of this disease have not been determined and there are no grounds for a system of preventive measures development.

Monitoring studies on the incidence of cattle telasiosis in the subtaiga subzone were conducted during 2003-2007, 2009-2012 and in 2016 (Table 1), when 5836 cattle were examined. Throughout the observation period 638 heads (10.93 ± 1.06%) were identified with the clinical signs of telasiosis. It was found that the incidence of animals with telasiosis varied during different periods of the study. So, the highest infestation was recorded in 2003 - 18.32%, and the smallest one in 2004 - 2.87%. When microscopic analysis of flushing from the conjunctival cavities of clinically ill animals was performed, 151 telasiases were found, among which the dominant species was Th. gulosa - 94.04 ± 2.04% of all collected parasites. Th. skrjabini was first discovered in the subtaiga sub-zone only in 2010, the dominance of this type of parasite made 5.96 ± 2.04%.

ISSN: 0975-8585

Table 1. The monitoring of telaziosis invasion in various natural and climatic zones of the Northern Ural region during the period from 2002-2016

Year of study	Amount of studied heads	Revealed signs of thelaziosis		Revealed thelaziosis carriers				
				Total number	Including			
					Th. gulosa		Th. skrjabini	
		heads	EI,%		number	ID, %	number	ID, %
Subtaiga subzone								
2003	786	144	18,32	27	27	100,0	0	0
2004	423	12	2,87	3	3	100,0	0	0
2005	706	73	10,34	16	16	100,0	0	0
2006	645	60	9,3	14	14	100,0	0	0
2007	798	84	10,53	25	25	100,0	0	0
2009	223	20	8,97	6	6	100,0	0	0
2010	345	48	13,91	14	12	85,71	2	14,29
2011	830	70	8,43	18	17	94,44	1	5,56
2012	530	76	14,34	19	15	78,95	4	21,05
2016	550	51	9,27	9	7	77,78	2	22,22
TOTAL:	**5836**	**638**	**10,93±1,06**	**151**	**142**	**94,04±2,04**	**9**	**5,96±2,04**
Subzone of the northern forest-steppe								
2002	652	42	6,44	9	6	66,67	3	33,33
2003	1020	143	14,02	27	23	85,18	4	14,82
2004	260	16	6,15	4	4	100,0	0	0
2005	2013	209	10,38	50	45	90,00	5	10,00
2006	1129	139	12,31	23	20	86,96	3	13,04
2007	1327	222	16,73	47	43	91,49	4	8,51
2008	1346	286	21,25	57	50	87,72	7	12,28
2009	4114	267	6,49	42	37	88,10	5	11,90
2010	957	183	19,12	38	31	81,58	7	18,42
2011	882	50	5,67	9	9	100,0	0	0
2012	250	38	15,20	15	15	100,0	0	0
2013	182	25	13,74	10	8	80,0	2	20,0
2014	113	10	8,85	2	2	100,0	0	0
2015	94	4	4,26	1	1	100,0	0	0
2016	77	17	22,08	5	5	100,0	0	0
TOTAL :	***14416***	***1651***	***11,45±1,04***	***339***	***299***	***88,20±1,70***	***40***	***11,80±1,70***
Subzone of the southern forest-steppe								
2002	106	9	8,49	3	3	100,0	0	0
2003	334	31	9,28	5	5	100,0	0	0
2004	405	33	8,15	11	9	81,82	2	18,18
2005	644	101	15,68	20	20	100,0	0	0
2006	878	101	11,50	23	19	82,61	4	17,39
2007	723	81	11,20	23	18	78,26	5	21,74
2009	819	72	8,79	18	15	83,33	3	16,67
2010	587	47	8,01	23	21	91,30	2	8,70
2012	261	24	12,20	9	6	66,67	3	33,33
TOTAL :	**4757**	**499**	**10,49±0,85**	**135**	**116**	**85,93±3,05**	**19**	**14,07±3,05**

In the subzone of the northern forest-steppe, the clinical examination of cattle for the presence of telaziosis invasion was carried out annually for fifteen years during the period from 2002 to 2016. Cattle breeding in this subzone is much more developed, thus, the number of animals surveyed is greater than in all other subzones together.

It was established that among the examined 14,416 heads of cattle, the clinical signs of telasiosis were revealed among 1651 animals (11.45 ± 1.04%). It was noted that the invasion of livestock by telasiosis had significant differences in different periods of observation. Thus, in 2008, 2010 and in 2016, the highest extensiveness of thelaziosis invasion was observed in 21.25, 19.12 and 22.08%, respectively. The lowest invasion of livestock by telasiosis was observed in 2002, 2004, 2009, 2011 and 2015, when the extent of invasion was 6.44, 6.15, 6.49.5.67 and 4.26%, respectively. During the microscopy of washings from conjunctival cavities, 339 larvae of telaziosis carriers were found out of which 299 (88.20 ± 1.70%) were Th. gulosa, and 40 (11.80 ± 1.70) were Th. skrjabini.

In the subzone of the southern forest-steppe 4757 heads of cattle were examined during nine years of research, among which 499 heads (10.49 ± 0.85%) had the signs of telasiosis. During the analysis of livestock invasion in different years of the study, it was found that the maximum infestation was fixed in 2005 - 15.68%, and the minimum one in 2010 - 8.01%. During the microscopy of flushes from the conjunctival cavities, 135 larvae of the telasias was found to be the dominant species, among which Th. gulosa had 116 units (85.93 ± 3.05%), Th skrjabini was represented in the least amount - 19 units (14.07 ± 3.05%).

It was noted that the telaziosis invasion in different years had different extensiveness (Figure 1). Moreover, the peaks of invasion of animals with telaziosis in different natural and climatic zones coincided, there were only the differences in terms of quantitative indicators. Thus, the general peaks of telaziotic invasion in the investigated subzones were observed in 2003, 2005, 2010 (except for the subzone of the southern forest-steppe where the invasion intensity was within the mean values), 2012 and in 2016 (during this year the studies in the subzone of the southern forest-steppe were not conducted). The minimal manifestation of telaziosis invasion also had general patterns in all studied subzones. Thus, the least infestation was recorded in 2004, 2009 and 2011.

The revealing of fluctuation regularities concerning the indicators of cattle invasiveness by the telasiases pushes us to study the factors that can affect the morbidity of the livestock by telaziosis for the justified development of preventive measures.

SUMMARY

Thus, it can be argued that the manifestation of the telasiosis invasion has certain regularities, the identification of which will allow to develop and rationally conduct the measures for the prevention of telasiosis, which will prevent the economic damage caused by this disease and has not only a scientific (the understanding of invasion maintenance mechanisms), but also an applied value (in epizootology, parasitology and agriculture).

ISSN: 0975-8585

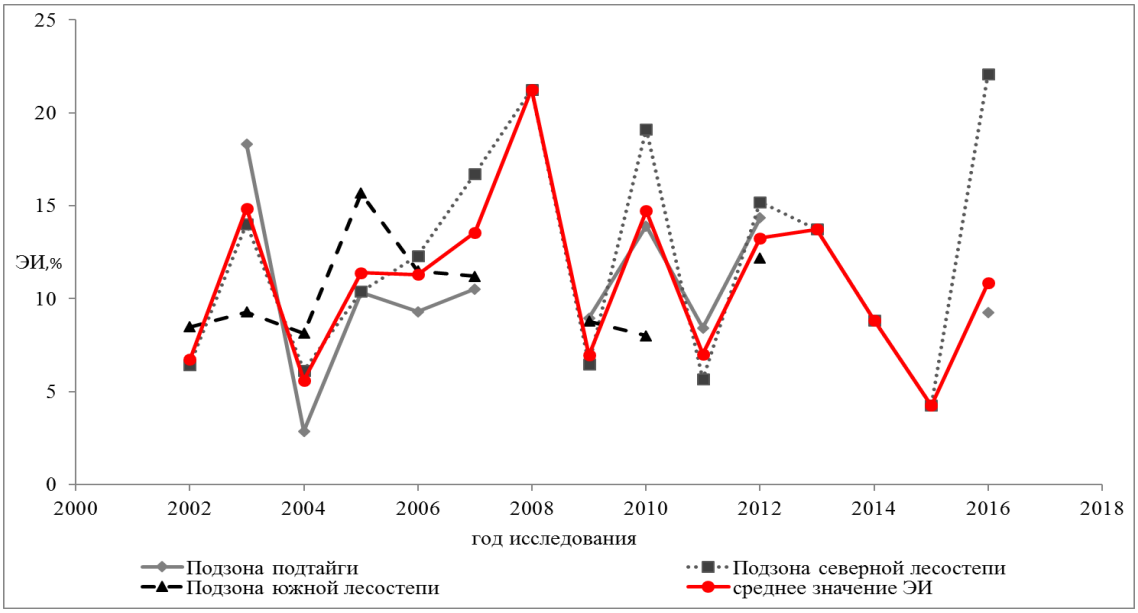

Fig. 1. The extensiveness of infestation with cattle telasiosis in various natural and climatic zones of the Northern Ural region during the period from 2002 to 2016.

REFERENCES

[1] Arunachalam K., Meenalochani V., Kannadhasan M.S. Occurrence of Bovine Thelaziosis in Dharmapuri District // Indian Vet. J., December. 2017, 94 (12): 84.

[2] Bradbury RS, Breen KV, Bonura EM, Hoyt JW, Bishop HS. Case Report: Conjunctival Infestation with *Thelazia gulosa*: A Novel Agent of Human Thelaziasis in the United States // Am J Trop Med Hyg. 2018 Feb 12. doi: 10.4269/ajtmh.17-0870. [Epub ahead of print].

[3] Glazunov1 Yu. V., Glazunova L. A. Phenology of Pasture Ticks in The Trans-Urals// Indian Vet. J., January 2018, 95 (01): 19 – 22

[4] Ryu JS[1], Im KI, Byun YJ, Kim SC. A case of human thelaziasis in Korea // Kisaengchunghak Chapchi. 1987 Jun;25(1):83-84.

[5] Samardžić K, Paradžik MT, Janjetović Ž, Živičnjak T, Arar ŽV, Martinković F, Siser Ž, Miletić-Medved M. The first case of ocular thelaziasis in croatia // Acta Med Croatica. 2015;69(5):475-80.

[6] Glazunov Yu.V., Glazunova L.A. The acarological situation in the south of the Tyumen region // Herald of the agrarian and industrial complex of Stavropol. 2015. N 2 (18). pp. 88-92.

[7] Glazunova L.A. Telasiosis among the cattle of meat breeds in the Northern Ural region // Bulletin of the Krasnoyarsk State Agrarian University. - 2014. - N 12. - pp. 150-154.

[8] Glazunova L.A., Bakharev A.A., Glazunov Yu.V. Telasiosis of the Geriford cattle in the Tyumen Region. The materials of the scientific session "The strategy of beef cattle breeding and fodder production development in Western Siberia". Tyumen June 19-21, 2013, pp. 11-16.

[9] Glazunova L.A., Glazunov Yu.V. Phenological features of zoophilic flies - intermediate hosts of telasiosis carriers in the Northern Ural region // Bulletin of the Altai State Agrarian University. 2017. N 8 (154). pp. 155-160.

[10] Grigor G.G., Zemtsov A.A. / The natural zoning of Western Siberia // Issues of geography / - M.: Publishing House of the USSR Academy of Sciences, 1961. - coll., 55.

[11] L. Karetin. Soil of the Tyumen region. Novosibirsk: - Science, 1990. - 281 p.

[12] Kosminkov N.E., Lypanov B.K., Domanitsky V.N., Belimenko V.V. Parasitology and parasitic diseases of agricultural animals. Textbook / Moscow, 2017.

[13] Lakin G.F. Biometrics. Moscow: Higher School, 1973. 343 p.

[14] Skipin L., Gaevaya E., Zaharova E., Petukhova V., Sidorova K. Biogeochemistry of heavy metals in trophic chain in terms of the south of Tumen region // Procedia Engineering (see in books). 2016. V. 165. pp. 860-868.

[15] Stolbova O.A., Glazunova L.A., Nikonov A.A., Glazunov Yu.V., Skosyrskikh L.N. Insects and mites - the parasites of cattle in the Northern Ural region // Fundamental research. 2014. N 11-12. pp. 2650-2655.

[16] Stolbova O.A., Glazunov Yu.V., Skosyrskikh L.N. Ticks-parasites of dogs in Northern Trans-Urals // Indo American journal of pharmaceutical sciences. 2018, 05 (03), 1675-1682

[17] Chasovshchikova M.A., Sheveleva O.M., Svjazhenina M.A., Tatarkina N.I., Satkeeva A.B., Bakharev A.A., Ponomareva E.A., Koshchaev A.G. Relationship between the genetic variants of kappa-casein and prolactin and the productive-biological characteristics of cows of the black-motley breed // Journal of Pharmaceutical Sciences and Research. 2017. T. 9. № 7. pp. 1038-1044.

[18] Tyumen Region Wikipedia // URL: http://en.wikipedia.org/wiki/ Tyumen Region (reference date: March 26, 2014).