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Organization of live animal transportation process in the Russian Federation

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SUMMARY
The paper covers the issues of organization of live animal transportation process in the Russian Federation as one of the factors of epidemiological risk associated with the spread of infectious animal disease pathogens. The legal framework, regulating the organization of live animal transportation using different vehicles, as well as quantitative data on live animal movements, taken from state veterinary information system "VetIS" ("Mercury" and "Cerberus" components) were analyzed. The analysis showed that live farmed animals are moved using all transportation means available, motor vehicles, planes, trains, ships as well as by driving. It was established that the major means of transport used to move live animals in the territory of the Russian Federation are motor vehicles. According to the analysis results 4.49 billion animals, including 4.41 billion poultry, 79.8 million large and small ruminants, pigs, horses, fur animals and bees were moved within the country in 2021. At the same time the number of issued veterinary accompanying documents for movements of cattle, poultry and pigs (i.e. in fact the transportations themselves) is much higher than the number of movements of other species. It was revealed that today only the movement of animals by railway is regulated in one way or another. The paper presents the suggestions to introduce the procedures aimed at improvement of biological safety and animal welfare during transportation. The results of the analysis performed can be used to optimize the control of animal transportation in the territory of the Russian Federation by competent authorities.

Keywords: live animals, animal transportation, animal welfare, veterinary accompanying documents, control, biological safety

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Организация процесса перевозки живых животных в Российской Федерации

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РЕЗЮМЕ
Материалы статьи освещают вопросы организации процесса перемещения живых животных в Российской Федерации как одного из важнейших факторов эпизоотологического риска распространения возбудителей инфекционных болезней животных. Проведен анализ нормативно-законодательной базы, регламентирующей вопросы организации перевозки живых животных различными видами транспорта в стране, а также количественных данных о перемещении живых животных из государственной информационной системы в области ветеринарии «ВетИС» (компоненты «Меркурий» и «Цербер»). В рамках выполненного исследования было определено, что перемещение живых сельскохозяйственных животных по территории страны происходит всеми видами доступного транспорта: автомобильным, воздушным, железнодорожным, водным, а также способом перегона. Установлено, что основным способом перемещения живых животных по территории Российской Федерации является автомобильный транспорт. Результаты анализа демонстрируют, что за 2021 г. по территории страны было перемещено 4,49 млрд гол. животных, из которых 4,41 млрд гол. составляет живая птица, порядка 79,8 млн гол. – крупный и мелкий рогатый скот, свиньи, лошади, пушные звери и пчелы. В то же время количество оформленных ветеринарно-сопроводительных документов для целей перемещения крупного рогатого скота, птицы и свиней (т. е., по сути, самих транспортных событий или фактов перевозки животных) значительно превалирует относительно перемещения других видов животных. Выявлено, что на сегодняшний день в той или иной мере законодательно регулируется только перевозка животных железнодорожным транспортом. В работе высказаны предложения по внедрению процедур, направленных на повышение биологической безопасности процесса перевозки животных и обеспечение благополучия животных. Результаты проведенного аналитического исследования могут быть использованы в рамках оптимизации контроля процесса перевозки живых животных по территории Российской Федерации со стороны компетентных органов.

Ключевые слова: живые животные, перевозка животных, благополучие животных, ветеринарно-сопроводительные документы, контроль, биологическая безопасность

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INTRODUCTION

Thanks to available modern vehicles and developed logistics, animals are transported over long distances in a relatively short time. Transportations can occur frequently during animals' lifetime. Animals that are moved to participate in sports competitions or exhibition events are most frequently moved. On average, three to four transportations occur during the lifetime of food-producing animals [1].

With animals and livestock products, infectious disease agents can be moved over considerable distances, crossing physical and administrative boundaries. Despite the existing mechanisms for movement control over animal consignments, there is a certain probability of animal disease agent spread to disease free territories. The Food and Agriculture Organization of the United Nations (FAO) describes animal transportation as an event "ideal for the spread of diseases". Moreover, this can occur under the influence of various both controlled and uncontrolled factors. For example, the movement of animals with a latent or subclinical infection, in case of biased laboratory results, non-comprehensive clinical examination of animals, violation of quarantine conditions, etc. In addition, the illegal movement of infected or contaminated live animals and livestock products contributing to uncontrolled spread of infectious diseases over considerable distances and in various directions is also of great significance [2–6].

A certain number of transport events happening during the animal life and the fact that each event makes the spread of an infectious disease possible emphasizes the need to ensure appropriate biosafety measures during animal movement [1, 6].

The purpose of this work was to analyze measures to ensure the biological safety of live animal movement across the territory of the Russian Federation and to develop proposals for correction and optimization of this process.

MATERIALS AND METHODS

The theoretical basis of the study was the analysis of the legal framework regulating live animal transportation by various means of transport in the Russian Federation.

The practical basis for the analysis of quantitative data on the movement of live animals across the territory of the Russian Federation in 2021 was the official information from the state veterinary information system "VetIS" (components "Mercury" and "Cerberus").

The quantitative (numerical) data were processed using Microsoft Office Excel software.

The generally accepted methods of data analysis were used: generalization and formalization of information, methods of comparative analysis and descriptive statistics.

RESULTS AND DISCUSSION

Quantitative and species structure of animals moved across the territory of the Russian Federation. The movement of live farmed animals, such as cattle, small ruminants, pigs, horses, poultry (chickens, geese, ducks, turkeys), fur animals (rabbits, foxes, minks, arctic foxes), as well as bees in the territory of the Russian Federation in 2021 was analyzed. Herewith, the categorization of the selected animal species based on their purpose did not matter, whether it is breeding, slaughter or rearing.

The units of measurement in the analysis were animals, with the exception of bees, which were accounted for in bee colonies / bee packages. That is why further in the text the term "animals" will be used taking into account the above statements. The choice of these categories of animals is explained by the results of a preliminary analysis, which showed that exactly these groups of animals provide the absolute majority in the volume of moved live animals, i.e. the influence of other animals on the results is insignificant.

The results of the analysis demonstrate a huge number of animals moved by different means of transport (Fig. 1).

4.49 billion animals were moved during the specified time period among them 98.2% is live poultry (4.41 billion animals). The number of other animals presented in the study was about 79.8 million animals It should also be taken into account that during a certain time the same animals could be moved several times depending on the production cycle of their rearing and slaughter. Since in this case the number of moved animals is described, then, of course, the number of their movements will be

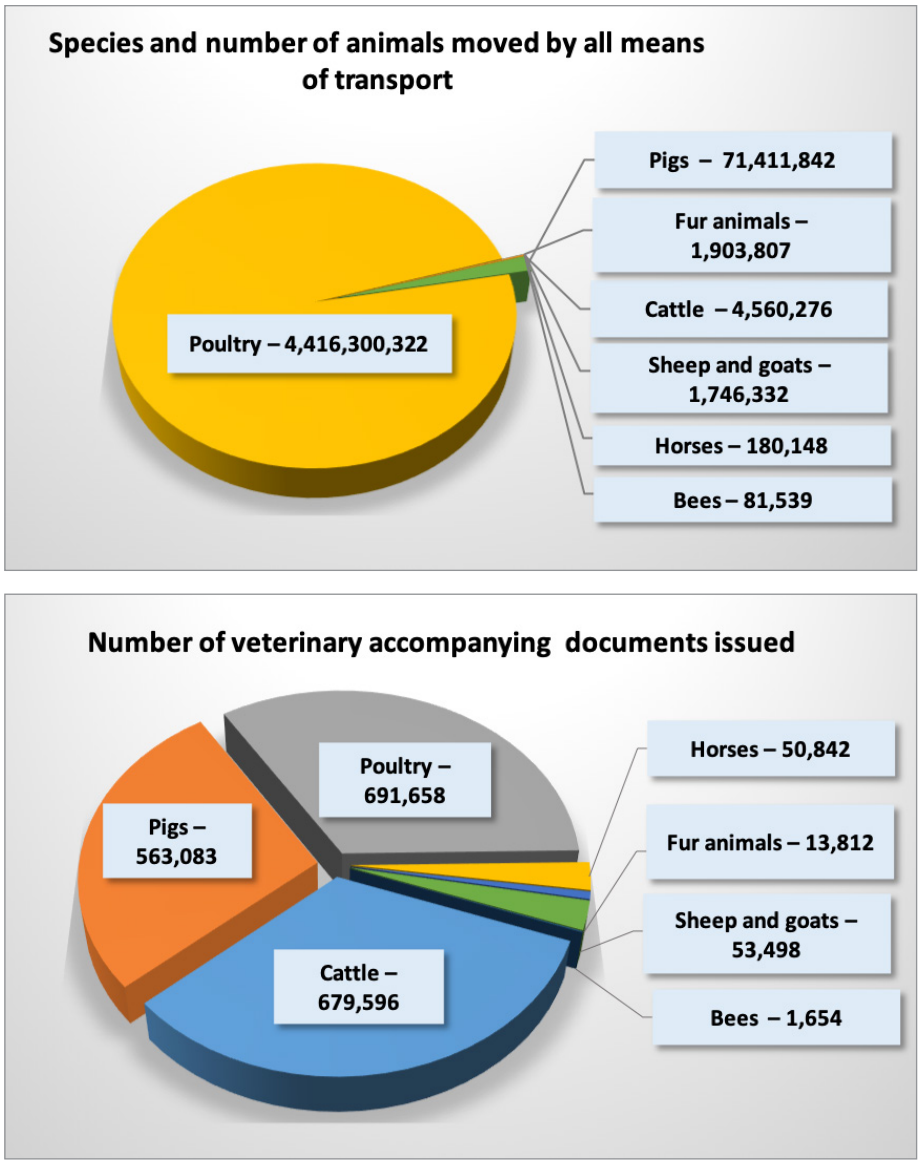

Fig. 1. Number of live animals moved in the territory of the Russian Federation in 2021

disproportionately less, since in most cases animals are moved in consignments, and veterinary and accompanying documents (VADs) are issued for a consignment of animals, and not for a specific animal. The latter is more typical for moving pets, i.e. companion animals, as well as for moving animals for personal use and individuals of special breeding value.

The analysis of the data showed that the largest number of VADs was issued for the movements of cattle, poultry and pigs, which significantly prevails over the number of movements of other animal species by tens and hundreds of times (Fig. 1). This should be taken into account during arrangement and conducting of surveillance over live animal movements across the territory of the Russian Federation, as well as during forecasting of the epidemic situation in a certain territory and in the country as a whole, since the movement of live animals should be considered as a social/economic factor or circumstance that determines the likelihood of epidemic situation complication, i.e. the movement of animals is nothing more than an epidemiological risk factor.

Means of transport used to move live animals in the territory of the Russian Federation. Due to the fact that various animal species are transported by different means of transport, and the ways of moving live animals across the country were analyzed.

The results presented in Figure 2 show that in the majority of cases the animals are moved across the country by road, namely 99.9% of the total number of moved animals. Out of the animals transported by other means of transport, the largest number were moved by driving or using public transport, little more than 6 million animals. As for the number of issued VADs for animal movements by various means of transport, the results of the analysis suggest that the largest number of documents were issued for movements of animals by road (about 2 million VADs) and public transport/driving (about 73 thousand VADs).

To determine the species structure of animals transported across the country by various means of transport, the available quantitative data were analyzed. The results showed that farmed poultry (including day-old chickens)

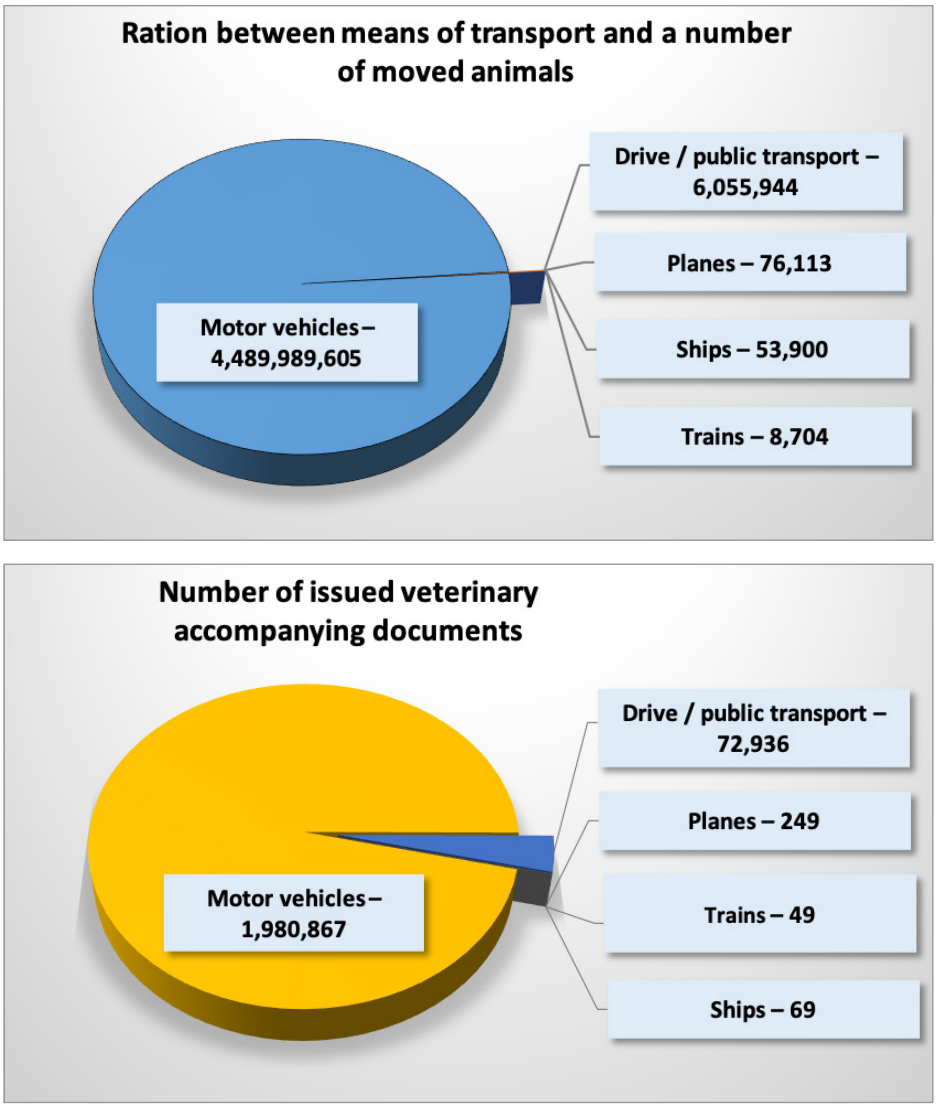

Fig. 2. Means of transport used to move live animals in the territory of the Russian Federation in 2021

is the main category of animals transported by air, rail, road and water transport. Separately, it is worth noting that driving or public transport are used in the vast majority of cases for movement of cattle and pigs. Other animal species are moved using the above-mentioned ways much less frequently. More detailed results of the analysis are presented in Figure 3.

Speaking about the number and ratio of issued VADs for transportation of animals by various means of transport, i.e. in fact, the transportation events themselves or the facts of animal transportation, it should be noted that the quantitative and species distribution does not differ from the one which is shown in Figure 3, with the exception of the length of digits.

Based on the results of the analysis, it can be logically concluded that in order to control the movement of live animals across the territory of the Russian Federation, the greatest resources (organizational, human, material, etc.) should be provided specifically for automobile and, to a certain extent, for public transport, as they are the major means of transport used to move animals, and consequently, they are also the leading factors of the epidemiological risk of spread of animal disease agents. However, the redistribution and concentration of resources in these areas should not have an impact on and weaken the control over the movement of animals by other means of transport. In addition, control over the movement of animals should be organized and adjusted taking into account the data obtained in this work, i.e. taking into account the species structure of animals transported by one or another type of transport.

Legislative aspects of animal movement in the Russian Federation. As shown in the previous section of this work, animals are moved across the territory of the Russian Federation using various types of transport (road, rail, water, air), as well as by driving and using public transport. There is no doubt that animals should be transported in compliance with certain requirements and rules aimed at:

– prevention of the animal disease agent spread, when the moved animal acts as a potential source of such agents;

– protection of the transported animal from the environmental pathogens;

– assurance of animal welfare during transportation, i.e. creation of optimal comfortable conditions for transportation and sticking to "five freedoms" concept: freedom

from hunger and thirst, freedom from discomfort, freedom from pain and injury, freedom from fear and distress, freedom to express normal and natural behavior [7].

A study of the Russian Federation legislation in this area has shown that currently the movement of animals across the country as a whole is regulated by the provisions of the Russian Federation Law dated 14.05.1993 No. 4979-1 "On veterinary medicine" [8]. In particular, article 13 of this law specifies that animals must be transported or driven along the routes agreed with the authorities responsible for federal official veterinary control (supervision) and in compliance with the requirements for the prevention of animal disease occurrence and spread. Indeed, live animals (as well as other regulated goods) are currently moved in the territory of the Russian Federation in accordance with the "Veterinary rules of Russian Federation regionalization" and the "Decision on establishment of infectious animal disease statuses in the Russian Federation regions and movement conditions of goods regulated by state veterinary surveillance" (approved by the Rosselkhoznadzor on 20.01.2017) [9, 10], which establish the regionalization procedure of the Russian Federation territory and the detailed procedure of the regulated goods movement in accordance with the animal disease statuses of the regions. Despite the fact that these documents contain certain requirements for the actual movement of animals, they are of a framework and limited nature. Perhaps a more detailed interpretation of these requirements was not the goal of these documents' development and enforcement. The fact is that at the time of their promulgation, a number of regulatory documents regulating the animal movement were in force in the country.

For example, the basic and fundamental act regulating the transportation of animals by rail is the "Rules of animal transportation by railway" [11]. The analysis of these requirements showed that despite the fact that the rules are not of veterinary nature and are approved by the Russian Federation Ministry of Transport, they contain the minimum necessary provisions for regulating the procedure and conditions of animal transportation by rail, including in veterinary and sanitary aspect.

As for the transportation of animals by air, previously this process was regulated by the "Guidelines on cargo transportation by the USSR domestic airlines" [12]. This manual contained certain requirements for the transportation of animals by aircraft, but since 18.10.2021, this document has become invalid on the territory of the Russian Federation.

Despite the fact that animals are moved across the country, including by water transport, there are no rules governing this process in open sources.

As for the rules for transportation of farm animals by public transport and by driving, there are also no existing regulatory documents in open sources. It is worth noting that the previous "Temporary animal health rules of driving (transportation) of farmed animals to distant pastures" [13] have become invalid on the territory of the Russian Federation since April 2020.

Regarding the requirements for the transportation of animals by road, previously this type of movement was regulated by the "Animal health rules of transportation of animals, poultry, fish, food products and raw materials of animal origin by motor vehicles" (approved by the USSR State Agricultural Committee on 30.01.1986 No. 432-5) [14]. These rules prescribed the animal

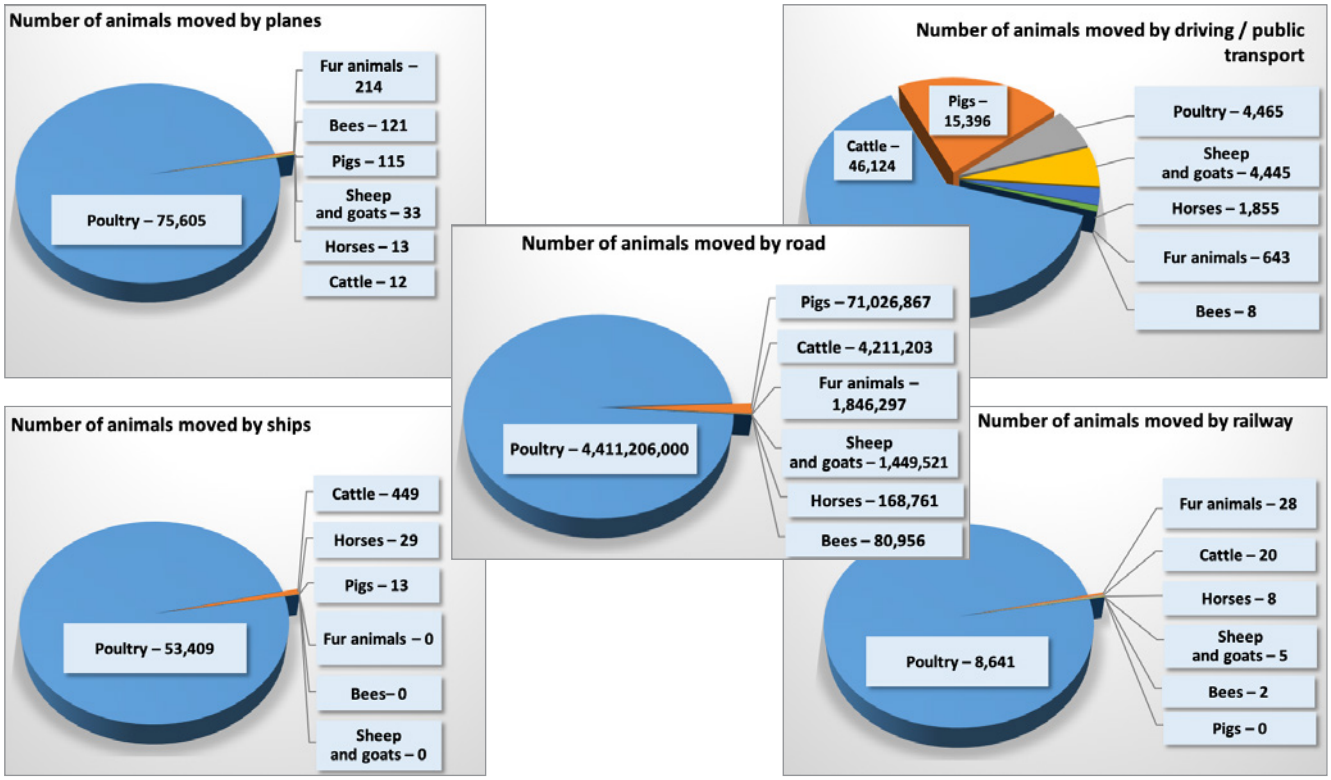

Fig. 3. Species and quantitative distribution of animals moved by different means of transport in the territory of the Russian Federation in 2021

transportation in sufficient detail, taking into account their type, quantity, duration of transportation, etc. However, as in previous cases, the document became invalid on the territory of the Russian Federation in 2020.

In addition, until 2018, the "General rules of transportation by road" [15] were in force, which contained minimum requirements for the transportation of animals and specific requirements for the technical condition of vehicles. However, in 2018, these rules became invalid, and now the current document is the Ordinance of the RF Government No. 2200 dated 21.12.2020 "On approval of rules of cargo transportation by motor vehicles and amendment of paragraph 2.1.1 of the Russian Federation Traffic Code" [16]. At the same time, with regard to the transportation of live animals, this document contains only a single mention that special vehicles are required for animal transportation, as well as an indication that after the transportation of animals and poultry, vehicles and containers must be washed and, if necessary, disinfected. The entire process of animal transportation shall be regulated by legislation. Moreover, the governmental regulation should cover the vehicles themselves. However, the above-mentioned Ordinance of the RF Government does not explain the term "special vehicle for animal transportation" and does not contain requirements for such vehicles. In general, there are currently no existing regulatory documents containing requirements for vehicles for animal transportation. This fact dictates the need for prompt correction of the legislative gap in this area. At the same time, it is possible to complement and amend existing regulations and develop an independent separate document. In any case, government regulation should address such aspects of movement as:

– requirements for moved animals, taking into account their species-age characteristics, physiological state and disease status, including infectious disease status;

– requirements for the vehicle and animal handlers;

– requirements for loading and unloading of animals;

– requirements for transportation conditions (stocking density in the vehicle, feeding, watering and resting of animals, fixation and cages/containers, etc.).

In other words, this document must contain the necessary and sufficient requirements to ensure an appropriate level of biosafety and biosecurity of animals, minimization of zoonotic risks, protection from extreme environmental conditions, as well as the transportation conditions that guarantee the above-mentioned "five freedoms". At the same time, the document should contain both general requirements and take into account the physiological characteristics and behavioral needs of different animal species, including wild and aquatic, as well as fish and insects.

Due to the high importance and relevance of the issue, we will focus separately only on the requirements for the vehicle and animal handlers. In particular, in our opinion and through the lens of foreign experience, the following procedures are proposed to be introduced in the country:

– animal transportation should be licensed by the government and relevant permits should be issued;

– authorized carriers must be added to the appropriate database available to stakeholders;

– authorized carriers must maintain a standard journey log on a mandatory basis;

– the vehicle must be subject to mandatory certification by the competent authority;

– the vehicle must be designed, constructed and operated in such a way as to minimize the risk of injury to animals and ensure their safety;

– the vehicle must be equipped with watering and feeding systems, as well as ventilation and temperature monitoring devices;

– the vehicle must be designed to contain the manure, litter or feed, and to permit thorough cleaning and disinfection after each transportation of animals, i.e. the vehicle must be made from the materials that can withstand repeated cleaning and disinfection;

– the vehicle must necessarily be equipped with recording equipment and a navigation system for displaying and recording data along the route, i.e. vehicles must be designated, but not adapted for the specified purposes;

– drivers and animal handlers should receive appropriate training (confirmed by a relevant certificate) on technical and administrative aspects of the Russian Federation and the Eurasian Economic Union (EAEU) legislation concerning the protection of animals during transportation, and covering at least such themes as animal physiology, practical aspects of animal handling, dealing with emergencies, safety rules, emergency response procedures, etc;

– live animals shall be transported only by authorized carriers using certified vehicles, equipment and appropriately qualified personnel;

– animal transportation routes shall avoid areas/zones under veterinary and sanitary restrictions due to any infectious disease, as well as areas with dense and/or vulnerable animal populations;

– transportation routes shall have approved parking places for animal resting and feeding;

– competent authority shall envisage control measures at any stage of the journey to identify compliances/non-compliances with the current legislation [1, 17–21].

The procedures proposed above should be integrated with the existing state veterinary information system "VetIS" and, in particular, with its components such as "Cerberus" and "Mercury" responsible for movements of goods regulated by the veterinary service, including live animals, since the identification of non-compliances of carriers, vehicles or animal handlers with the established requirements would automatically ban the movement of live animals.

CONCLUSION

The results of the study showed that live farmed animals are moved across the territory of the Russian Federation by all modes of transport: by road, by air, by rail, by water, as well as by driving in various amounts. The species distribution of moved animals shows that agricultural poultry makes up the bulk of transported animals. However, the number of veterinary accompanying documents issued for the movements of cattle, poultry and pigs significantly prevails over the number of movements of other animal species.

In fact, today, only the movement of animals by rail is legally regulated. With regard to the movement of animals by other modes of transport, no existing regulatory documents have been identified. Consequently, the question arises about the completeness

and sufficiency of control over this process in the absence of existing regulations. In particular, this applies to the movement of animals by road, used to transport a huge number of animals in our country, which is not commensurate with the number of animals transported using the others modes, i.e. the main way of moving live animals across the country.

The proposals made in this paper on the regulatory regulation and transportation of animals should serve as a basis for the creation of conditions to ensure the welfare of animals during transportation, protect animals from environmental factors, including animal disease pathogens, and to reduce the risks of pathogens spread in the Russian Federation.

REFERENCES

1. National Biosecurity Standard for Livestock, Poultry and Deadstock Transportation. Available at: https://inspection.canada.ca/animal-health/terrestrial-animals/biosecurity/standards-and-principles/transportation/eng/1519235033628/1519235183948?chap=0#s3c1.

2. FAO. Improved Animal Health for Poverty Reduction and Sustainable Livelihoods: Animal Production and Health Paper 153. Rome: FAO; 2002. 44 p. Available at: https://www.fao.org/3/y3542e/y3542e.pdf.

3. MacDiarmid S. C. The spread of pathogens through international trade. Introduction. *Rev. Sci. Tech*. 2011; 30 (1): 13–29. DOI: 10.20506/rst.30.1.2015.

4. O sostoyanii epizooticheskoi obstanovki v Rossiiskoi Federatsii I predprinimaemykh protivoepizooticheskikh meropriyatiyakh po nedopushcheniyu massovykh zabolevanii sel'skokhozyaistvennykh zhivotnykh: postanovlenie Soveta Federatsii Federal'nogo sobraniya RF ot 28.06.2017 № 207-SF = Epidemiological situation in the Russian Federation and anti-epidemic measures taken to prevent mass diseases in farmed animals: Ordinance of the Federation Council of the RF Federal Assembly No. 207-SF of 28.06.2017. Available at: https://docs.cntd.ru/document/456074703. (in Russ.)

5. Fèvre E. M., Bronsvoort B. M., Hamilton K. A., Cleaveland S. Animal movements and the spread of infectious diseases. *Trends Microbiol*. 2006; 14 (3): 125–131. DOI: 10.1016/j.tim.2006.01.004.

6. Greger M. The long haul: risks associated with livestock transport. *Biosecur. Bioterror.* 2007; 5 (4): 301–311. DOI: 10.1089/bsp.2007.0028.

7. WOAH. Terrestrial Animal Health Code. General provisions. Vol. 1. Paris; 2022. Available at: https://www.woah.org/en/what-we-do/standards/codes-and-manuals/terrestrial-code-online-access.

8. O veterinarii: Zakon RF ot 14.05.1993 № 4979-1 = On veterinary medicine: RF Law No. 4979-1 of 14.05.1993. Available at: https://www.consultant.ru/document/cons_doc_LAW_4438. (in Russ.)

9. Ob utverzhdenii Veterinarnykh pravil provedeniya regionalizatsii territorii Rossiiskoi Federatsii: prikaz Minsel'khoza Rossii ot 14.12.2015 № 635 = On approval of veterinary rules of Russian Federation regionalization: Order of RF MoA No. 635 of 14.12.2015. Available at: https://fsvps.gov.ru/ru/fsvps/laws/4600.html. (in Russ.)

10. Reshenie ob ustanovlenii statusov regionov Rossiiskoi Federatsii po zaraznym boleznyam zhivotnykh i usloviyakh peremeshcheniya podkontrol'nykh gosvetnadzoru tovarov: utv. Rossel'khoznadzorom 20.01.2017 = Decision on establishment of infectious animal disease statuses in the Russian Federation regions and movement conditions of goods regulated by state veterinary surveillance: approved by Rosselkhoznadzor on 20.01.2017. Available at: https://fsvps.gov.ru/ru/fsvps/laws/4857.html. (in Russ.)

11. Ob utverzhdenii Pravil perevozok zheleznodorozhnym transportom zhivotnykh: prikaz Mintransa Rossii ot 19.10.2020 № 427 = On approval of rules of animal transportation by railway: Order of RF Ministry of Transport No. 427 of 19.10.2020. Available at: http://publication.pravo.gov.ru/Document/View/0001202102150021. (in Russ.)

12. Rukovodstvo po gruzovym perevozkam na vnutrennikh vozdushnykh liniyakh Soyuza SSR (RGP): utv. MGA SSSR 20.08.1984 = Guidelines on cargo transportation by USSR domestic airlines: approved by USSR Ministry of Civil Aviation on 20.08.1984. Available at: https://e-ecolog.ru/docs/rwp3GKzwnyUVDsMcIluCI/full. (in Russ.)

13. Vremennye veterinarno-sanitarnye pravila pri organizatsii peregona (perevozki) sel'skokhozyaistvennykh zhivotnykh na otgonnye pastbishcha: utv. GUV MSKh SSSR 04.09.1975 = Temporary animal health rules of driving (transportation) of farmed animals to distant pastures: approved by Chief Veterinary Department of the RF MoA on 04.09.1975. Available at: https://base.garant.ru/70502260. (in Russ.)

14. Veterinarno-sanitarnye pravila perevozki zhivotnykh, ptitsy, ryby, produktov i syr'ya zhivotnogo proiskhozhdeniya avtomobil'nym transportom: utv. Gosagropromom SSSR 30.01.1986 № 432-5 = Animal health rules of transportation of animals, poultry, fish, food products and raw materials of animal origin by motor vehicles: approved by the USSR State Agriculture Committee No. 432-5 on 30.01.1986. Available at: https://legalacts.ru/doc/veterinarno-sanitarnye-pravila-perevozki-zhivotnykh-ptitsy-ryby-produktov. (in Russ.)

15. Obshchie pravila perevozok gruzov avtomobil'nym transportom: utv. Minavtotransom RSFSR 30.07.1971 = General rules of transportation by road: approved by RSFSR Ministry of Motor Transport on 30.07.1971. Available at: https://www.consultant.ru/document/cons_doc_LAW_14117/05da6926bb6ffcb73fedbdc748099f1bbc9fcd98. (in Russ.)

16. Ob utverzhdenii Pravil perevozok gruzov avtomobil'nym transportom i o vnesenii izmenenii v punkt 2.1.1 Pravil dorozhnogo dvizheniya Rossiiskoi Federatsii: postanovlenie Pravitel'stva RF ot 21.12.2020 № 2200 = On approval of rules of cargo transportation by motor vehicles and amendment of Paragraph 2.1.1 of the Russian Federation Traffic Code: Ordinance of the RF Government No. 2200 of 21.12.2020. Available at: http://www.consultant.ru/document/cons_doc_LAW_371981. (in Russ.)

17. Council Regulation (EC) No. 1/2005 of 22 December 2004 on the protection of animals during transport and related operations and amending Directives 64/432/EEC and 93/119/EC and Regulation (EC) No. 1255/97. Available at: https://eur-lex.europa.eu/legal-content/en/ALL/?uri=CELEX%3A32005R0001.

18. Porta F., Mertin I., Waley D. Live Animal Transport: Time to Change the Rules. Brussels; Eurogroup for Animals;

2021. Available at: https://www.eurogroupforanimals.org/files/eurogroupforanimals/2021-12/2020_01_27_efa_transport_white_paper_0.pdf.

19. Lapworth J. W. Engineering and design of vehicles for long distance road transport of livestock: the example of cattle transport in northern Australia. *Vet. Ital*. 2008; 44 (1): 215–222. PMID: 20405427.

20. Mitchell M. A., Kettlewell P. J. Engineering and design of vehicles for long distance road transport of livestock (ruminants, pigs and poultry). *Vet. Ital*. 2008; 44 (1): 201–213. PMID: 20405426.

21. Fike K., Spire M. F. Transportation of cattle. *Vet. Clin. North Am. Food Anim. Pract*. 2006; 22 (2): 305–320. DOI: 10.1016/j.cvfa.2006.03.012.

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