ABSTRACT

Dissertation work of Zhangeldy Tarihovich Ussenov "Helminth infestations of saigas and cattle, development of veterinary and sanitary measures" submitted for the degree of Doctor of Philosophy (PhD) in the specialty 6D120200 - Veterinary Sanitary

The relevance of the research topic. The degree of distribution of helminths of ungulate animals, including saigas, is in direct dependence on climatic and geographical conditions of pasture areas and external factors (temperature, humidity, etc.), which inhibit or promote the development and preservation of invasive elements in the external environment. The enclosure of saigas certainly affects the formation and distribution of saiga helminth fauna, as well as their circulation in the biogeocenoses of the given area of the territory.

Over the past ten years, thanks to state conservation programs, the number of saigas in Kazakhstan has increased 60 times. There are now more than 1.3 million individuals of these mammals live in the country. Such a high saiga population has its own risks for agriculture.

The competition between saigas and farm animals for pastures and watering places has intensified, and cases of saigas poisoning crops have become more frequent. For example, the area of agricultural land in West Kazakhstan province has tripled in the last 15 years, and the number of saigas in the Ural population has increased 53 times (from 15,000 to 800,000 individuals). In addition, due to the increased density of saigas, there is a risk of a repeat of the epizootic.

Nevertheless, saiga populations are directly dependent on various natural factors and diseases that can lead to mass deaths of animals. Parasitic infestations are no exception, so the topic of research is relevant and of important scientific and practical importance.

The animals have a distinct seasonal distribution in natural zones. During migration herds of saigas graze mainly on the same pastures as sheep. However, saigas constantly change pasture areas.

The parasites of saigas and domestic ruminants are 50-100% common. However, some of these parasites are more specific to saigas. These can include A.centripunctata, S.ovis and N.gazellae. Undoubtedly, saigas play an important role in their distribution and infestation of domestic animals.

The aim of this dissertation research is to study the helminth fauna of saigas and cattle and to develop veterinary and sanitary measures for the prevention of helminth infections.

Research objectives:

- to study the helminth fauna of captive saigas;
- to study the helminth fauna of captive saigas in West Kazakhstan region;
- study the effectiveness of drugs against digestive strongylosis and monozyosis in captive saigas;
- to study the helminth fauna of cattle in West Kazakhstan region;

- evaluate the effectiveness of a number of drugs from different classes of chemical compounds in cattle helminthiasis;
- to develop veterinary and sanitary measures to prevent the main helminth infections in cattle in the conditions of West Kazakhstan region;
- develop veterinary and sanitary measures to prevent the disease of saigas with the main helminth infections when kept in captivity.

Research methods. The research work was carried out in the captive breeding facility for saigas located in the Taskala district of West Kazakhstan province (2016-2019), the ASAR live breeding facility in Zhanaarkinsky district, Ulytau region (2022) and in habitats of the Ural saiga population in the West Kazakhstan region from 2016 to 2022.

Cattle helminth infections were studied from 2016-2022 in districts of West Kazakhstan region, as well as within the AP05136002 project "Development of measures to control major helminth infections of cattle in steppe, semi-desert and desert zones of West Kazakhstan region depending on meteorological conditions" 2018-2020.

The effectiveness of the preparations was taken into account according to the results of coproscopy before and 14 days after deworming. Saiga fecal samples from all groups were examined by flotation using a VIGIS counting chamber to record the number of helminth eggs in 1 g of feces. The effectiveness of the preparations was calculated using the "control test" type. The results were statistically processed using the Microsoft Excel computer program.

The main provisions put to the defense:

Helminth fauna of captive saigas in the West Kazakhstan region.

Effectiveness of drugs for digestive tract strongylosis and monniasis in captive saigas.

Helminth fauna of cattle in West Kazakhstan region.

The effectiveness of a number of drugs from different classes of chemical compounds in cattle helminthiasis.

Veterinary and sanitary measures to prevent the disease of cattle with the main helminth infections in the conditions of the West Kazakhstan region.

Veterinary and sanitary measures to prevent the disease of saigas with the main helminth infections in captivity.

Description of the main results of the study.

The results showed that the following were found in saigas in the nursery: cestodes Moniezia expanza, Echinococcus granulosus (Batsch,1786) larvae, nematodes N. spathiger (Railliet, 1896), O. ostertagi (Stiles, 1892), T. colubriformis (Giles, 1892), M. marshalli (Ransom, 1907), H. contortus (Rudolphi, 1803), Trichocephalus skrjabini (Baskakov, 1924).

Saigas in the Center for Biodiversity Conservation of Wild Animals, West Kazakhstan Agrarian and Technical University named after Zhangir Khan, located on the territory of Taskala district of West Kazakhstan region, were infested with 8 helminth species belonging to 2 classes, 4 families and 8 genera.

The high efficacy of the supramolecular complex of albendazole with polyvinylpyrrolidone was obtained on saigas spontaneously invaded by digestive

strongylates and monizia. The efficacy of the albendazole supramolecular complex was higher than that of the basic drug «Ashialben».

In cattle and saigas a common helminthofauna from the class Cestoda - Echinococcus granulosus larvae from the class Nematoda - helminths from genera Nematodirus, Trichostrongylus and Haemonchus was found.

Cattle and saigas in West Kazakhstan region are infested with helminths of the families Taeniidae and Trichostrongylidae. They are parasitized by larval cestodoses of the genus Echinococcus and nematodes of the genera Trichostrongylus, Haemonchus and Nematodirus. Saigas are a natural reservoir and a constant source of helminth infestation in West Kazakhstan region. Therefore, when planning treatment and preventive measures against helminth infestations of domestic ruminants, it is necessary to take this factor into account.

According to the data of helminthological studies in the steppe, semi-desert and desert zones of West Kazakhstan region in cattle parasitized by representatives of 2 classes of helminths, 4 families, 8 genera, including 9 species of helminths, of which 4 species are biohelminths, and 5 species are geohelminths.

The detected helminths have the following extensiveness and intensity of invasion: (EI-14.2%, II-164.5±13.7 ex./head), E.granulosus (larvae) (EI -35.8%), Nematodirus spp. (EI -35.01%, II -117.9±9.8 ex./head), Ostertagia spp. (EI - 60.5%, II -85.1±7.0 ex./head), Cooperia spp.(EI-55.1%, II -80.4±6.7 ex./head), Haemonchus spp. (EI-22.4%, II -129.5±10.7 ex./head), Trichostrongylus spp. (EI-22.6%, II -120.1±10.0 ex./head), Thelazia rhodesi (EI-35.8%, II -13.3±1.1 ex./head).).

The most extensive invasion of cattle by M. expansa was noted in the autumn period by 17.5%, and the lowest in the spring - 10.9%.

The most extensive invasion of cattle with strongylates of the digestive tract was noted in the autumn period by 35.1%, and the least in winter - 17.6%.

The most extensive invasion of cattle by Thelazia rhodesi was noted in the autumn period by 81.4%, and the least in winter - 2.4%.

In the West Kazakhstan region, the age dynamics of infection with helminths in cattle is expressed. The extent of M.expansa invasion decreases with age. The greatest extent of invasion of animals was noted at the age of up to one year - 28.1%, and the smallest - 10 years and older - 0%.

The extent of invasion by strongylates of the digestive tract decreases with the age of the animals. The greatest extent of invasion of animals was noted at the age of 1-3 years - 35.8%, and the lowest -10 years and older - 21.1%.

Extensity of invasion of larval echinococcosis increases with age of animals. The least extensiveness of invasion was noted at the age of up to one year (0%), and the greatest - 10 years and older - 58.8%.

Compared to 2018, the extensiveness of cattle invasion increased in 2019 by moniesia by 2.5%, and by strongylates of the digestive tract by 1.6%. In our opinion, this is due to an increase in precipitation.

On average per year, the extensiveness of the invasion of cattle by Th. rhodesi was 37.8%. The greatest extensiveness of invasion was noted in autumn 86.4%. and the smallest in winter - 2.8%.

The extensiveness of the invasion of cattle with telazia in 2019 increased by 2.5% compared to 2018. In our opinion, this is due to the increase in precipitation in 2019.

Albendazole 10% powder at a dose of 7.5 mg/kg according to DV showed high efficiency in moniesiosis and strongylatoses of the digestive tract, but was not effective in cattle thelaziosis. Its greatest efficiency was in the semi-desert zone in the autumn period, and the smallest in the steppe zone in the spring period.

Ivermek 1% solution at a dose of 0.2 mg/kg according to DV showed high efficiency in case of strongylatoses of the digestive tract and thelaziosis, but was not effective in cattle moniesiasis. Its greatest efficiency was in the desert zone in the spring and autumn periods, and the smallest in the steppe zone in the summer.

Clozan 5% solution at a dose of 2.5 mg/kg according to DV showed moderate efficacy in case of strongylatoses of the digestive tract, but was not effective in bovine moniesiasis and thelaziosis. Its greatest efficiency was in the desert zone in the spring and autumn periods, and the smallest in the steppe zone in the summer and autumn periods.

Ophthalmostar-gel at a dose of 2.5 mg/ml of the dosage form for ivermectin showed high efficiency in thelaziosis, but was not effective in moniesiosis and strongylatosis of the digestive tract of cattle. Its greatest efficiency was in the desert zone in the summer and autumn periods, and the smallest in the steppe zone in all periods.

Compliance with the directions of development of science or government programs.

Dissertation research was carried out within the framework of scientific projects:

- grant funding of the Ministry of Education and Science of the Republic of Kazakhstan for 2018-2020. AP05136002 on the topic "Development of measures to combat the main helminthiases of cattle in the steppe, semi-desert and desert zones of the West Kazakhstan region, depending on meteorological conditions."

Description of the contribution of the doctoral student to the preparation of each publication.

The doctoral student independently conducted experimental research, data collection, analysis and interpretation, participated in writing articles.

In total, 20 scientific articles were published on the topic of the dissertation, including 2 in peer-reviewed scientific journals included in the Scopus database, 5 in publications recommended by Committee for Quality Assurance in the Field of Science and Higher Education of the Ministry of Science and Higher Education of the Republic of Kazakhstan, 9 in the materials of international scientific and practical conferences.

The volume and structure of the dissertation. The dissertation is presented on 142 pages, consists of the following sections: introduction, choice of research direction, materials and methods, research results, conclusion. The work contains 20 figures, 42 tables and 14 appendices. The list of sources used includes 191 items.