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Testing in Farm Conditions and Studying the Economic Effectiveness of Disinvasive Substances Against the Causative Agents of Bovine Nematodirosis

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Abstract

The article deals with the research carried out on testing in farm conditions of disinvasive preparations against eggs of nematodirosis causative agents on livestock farms and the resulting economic efficiency. As a result of the research conducted, for the first time in Azerbaijan, the non-invasive effect of solutions of deltatrine and citrine preparations of various consistencies against eggs of causative agents of nematodirosis in cattle was studied. It was found that a 3.0% solution of deltatrine preparation against eggs of causative agents of bovine nematodirosis gives an efficiency of 92.0%. Given the practical benefits, high disinvasive effect, and effectiveness from economic point of view against bovine nematodirosis, the use of a 3.0% solution of the deltatrine preparation in large farms is considered more appropriate. From the studies conducted in farm conditions, the economic damage and the resulting economic benefit were calculated, based on the results obtained during the implementation of disinvasive measures against causative agents of nematodirosis in cattle. As a result of mathematical calculations, it was found that, at the rate of per 1 head of animal against nematodirosis in cattle, a 3.0% deltatrine preparation gives an economic effect of 94 manats.

It should be noted that timely identification of the origin of the disease is its practical significance. And the identification of patterns of formation of parasitofauna within the farm is the theoretical significance of the research work. Therefore, testing the disinvasive preparations in farm conditions against causative agents of nematodirosis in livestock farms under economic conditions and calculating the resulting economic effect is relevant.

Keywords: livestock farm, farm testimg, disinvasive effect, scatological examination, economic efficiency

Introduction

Cattle breeding is one of the main branches of animal husbandry, and increasing the productivity of this industry plays a key role in food security. The development of livestock is negatively affected by parasitic, including helminthic diseases. It should be noted that helminthiasis is widespread among rodents, and in young animals these diseases are observed intensively (Andrushko, 2012; Mammadova, 2020; Gazimaghomedov, 2009; Sarbasheva et al., 2010). Due to the weak immune system, infection easily occurs in young animals. Favorable conditions cause an increase in the extensiveness and intensity of invasive diseases. Scientists from both foreign countries and our republic carry out thorough scientific work on the treatment and prevention of parasitic diseases and disinvasive measures (Aghayeva, 2016; Bayramov, 2017; Badirova, 2022; Konahovich & Mironenko, 2021; Mammadova, 2020; Yusifov et al., 2015).

Therefore, the goal was set for carrying out of testing of invasive preparations against causative agents of nematodirosis on livestock farms in farm conditions and calculating the results of economic effect.

Materials and methods

In 2023, research works were tested in extensive farm conditions in individual livestock farms in the village of Beshtam in the Siyazan municipal district as invasive substances against causative agents of nematodirosis, and scatological studies were conducted in the Department of Parasitology of VSRI. During the research, the fields where experiments were carried out in the farm conditions were isolated from other fields, divided into 3 sections of 50 m^2 each. The 1st field was sprayed with a 3.0% solution of the deltatrine preparation for the purpose of experiment, the 2nd field with 4.0% phenol solutions for comparison, the 3rd field was sprayed with ordinary water for control purposes. By means of the NGR - 05 mobile sprinkler system, disinvasive solutions were sprayed at the rate of 1.0 liters per 1 m^2 of the field. After a 3-hour exposure period, faecal samples (25 samples from each field) were taken and examined before spraying the disinvasive solutions on the experimental fields (Gurbanov, 2002). The economic damage caused by nematodirosis was determined according to the accepted rules, the economic efficiency of disinvasive solutions used in the farm was calculated using mathematical formulas of economic efficiency obtained during disinvasive measures in accordance with the prices of the market economy for the current year (Hajiyev, 2002; Sivkova, 2018).

Results

The final stage of the ongoing disinvasive work should be applied in production after testing in farmc conditions.

During the scatological examination, nematode eggs were detected on faecal samples taken from a cowshed where cattle were kept, and during a helminthological examination within the incomplete autopsy of animals slaughtered in slaughterhouses, nematodiruses were found. As a result of the scatological examination (25/17), 68.0% of nematodirosis infection was detected, and during the incomplete autopsy examination, nematodiruses were detected in 8 (66.7%) of 12 intestines of cattle.

The research work carried out was performed in accordance with the rules adopted in veterinary medicine. So, for experimental purposes, 3.0% solutions of the deltatrine preparation were used against eggs of causative agents of nematodirosis in cattle, for comparison - 4.0% solutions of phenol, for control purposes -ordinary water. In a livestock farm isolated from other fields, 3 plots of 50 m^2 each were alloted, and the experiments were continued. By means of the NGR - 05 mobile sprinkler system, disinvasive substances were sprayed at the rate of 1.0 liters per 1 m^2 of area, after 3 hours of exposure, 25 samples were taken from different places of each alloted area and examined for scatology. In the 1st field sprayed with a 3.0% solution of the deltatrine preparation for experimental purposes, the effectiveness of the preparation was 92.0%, in the 2nd field (organized for comparison), the effectiveness of a 4.0% phenol solution was 56.0%.

In field 3 (organized for control), ordinary water was sprayed, faecal samples were collected and scatological studies were conducted. It was found that infection (66.7%) occurs due to the fact that no preparation was applied in field 3.

From the studies carried out in the farm conditions, based on the results obtained when performing disinvasive measures against the causative agents of nematodirosis in cattle, the economic damage and the resulting economic effect were calculated. With this disease, physiological processes in animals are disrupted, and milk production decreases by 20-40%, and the live weight of the animal decreases by 15-20 kg.

Being the final results of our research carried out, the deltatrine preparation was used for the disinvasive purposes of causative agents of bovine nematodirosis.

The damage caused to one head of cattle is calculated according to the following formula:

$$N_d = D_{aw} \times D_{pw}$$

N_d - damage from nematodirosis

D_{aw} – decreased amount of live weight

D_{pw} - the price of 1 kg of live weight

With a live weight of 1 head of animal of 350 kg during the period of sickness, it loses 4.3% or 15 kg of live weight.

If the price for 1 kg of live weight of cattle is 4.00 man, then the price for lost live weight is

$$D_{pw} = 4 \text{ man.}$$

$$D_{aw} = 15 \text{ kg.}$$

$$X = 15{,}0 \text{ kg} \times 4{,}00 \text{ man.} = 60 \text{ man.}$$

One head of healthy cattle infected with nematodirosis gives 12 liters of milk in 1 day, and the loss of milk during the disease is 30%.

$$N_{d2} = M_a \times M_p$$

Here:

N_{d2} – damage from milk during the disease

M_a – decreased amount of milk

M_p – the price of 1 liter of milk

12 liter x 30% = 360 :100 = 3,6 liter

M_a=3,6 liters the amount of milk lost per day

3,6 liters x 20 days = 72 liters (milk)

Which means that 72 liters of milk are lost during the disease.

if 1 liter of milk costs 60 gopiks,

$$72 \times 0{,}60 = 43 \text{ man. } 20 \text{ gop.}$$

Consequently, milk loss

$$M_l = 43 \text{ man. } 20 \text{ gop.}$$

According to the calculations carried out, the economic damage from a decrease in the live weight of cattle infected with nematodirosis is 60.0 manats, and the economic damage from a decrease in dairy products is 43 manats 50 kopecks. In general, the loss caused by nematodirosis of productivity per 1 head of cattle is calculated using the formula:

$$N_{dc} = (D_d \times M_l)$$

$$N_{dc} = 60{,}0 + 43{,}20 = 103 \text{ man. } 20 \text{ gop.}$$

D_d – economic damage per live weight

M_l – economic damage from the loss of milk productivity

The cost of the deltatrine preparation, used against nematodirosis, was calculated as follows.

In our research carried out, the following indicators were used to determine

economic efficiency:

- the price of 1.0 liter of the deltatrine preparation – 24,0 manats
- 3.0% deltatrine consumed per $1m^2$ of area - 1.0 liter
- the price of 1 liter of 3.0% of the deltatrine preparation - 72 gopiks

Therefore, the cost of the preparation spent on disinvasion for one head of cattle is 72 gopiks.
The cost of labor spent on each $1m^2$ of the field during disinvasion is 30 gopiks.
The economic effect obtained during the disinvasive measures is calculated using the following formula

$$E_e = N_d – (P_p + S_{cl})$$

E_e – the economic efficiency of the measure carried out
N_d – damage caused by nematodirosis - 103 man. 20 gop.
P_p – the price of preparation – 72 gop.
S_{cl} – the cost of labor spent - 30 gop.
E_e = 103 man. 20 gop.– (72 gop.+ 30 gop.) = 102 man. 18 gop.

Damage in the amount of 102 man. 18 gop. per 1 head of animalwas prevented from the disinvasive measures carried out against nematodirosis in cattle.

The applied 3.0% deltatrine preparation showed the effectiveness of disinvasion 92.0% in farm conditions:

1,02 man. 18 gop. x 92,0% = 94 manats

Thus, in case of bovine nematodirosis, 3.0% of the deltatrine preparation at the rate of per 1 head of animal, an economic effect of 94 manats is obtained.

Consequently, when using a 3.0% solution of the deltatrine preparation against bovine nematodirosis as a disinvasive agent, it gives an effect of 92.0% and an economic effect of 94 manats is obtained. Considering the practical benefits, high disinvasive effect, and effectiveness from economic point of view against nematodirosis in cattle, the use of a 3.0% solution of the deltatrine preparation in large farms is considered more appropriate.

During the occurrence of invasive diseases, pathologies in the organism of the host animal, along with parasites, are caused by causative agents of its infectious diseases. So, in those parts where the wholeness of the intestine is disrupted and wounds have formed, microorganisms multiply, the inflammatory process accelerates, the pathological process deepens, the treatment becomes ineffective. From this point of view, it should be noted that during outbreaks of invasive

diseases, farms suffer economic damage, and profitability decreases. The prevention of damage to farms is possible with the timely detection of both infectious and invasive diseases and timely implementation of therapeutic and preventive measures against them.

Discussion

1. During the production testing, the effectiveness of 3.0% of the deltatrine preparation against causative agents of nematodirosis was 92.0%, the effectiveness of 4.0% of phenol used for comparison was 56.0%.
2. The 3.0% deltatrine preparation at the rate of per 1 head of cattle against bovine nematodirosis produced an economic effect of 94 manats.
3. Considering the practical benefits, high disinvasive effect, and effectiveness from economic point of view against nematodirosis in cattle, the use of a 3.0% solution of the deltatrine preparation in large farms is considered more appropriate.

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