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ECOLOGICAL-EPIZOOTOLOGICAL SIGNIFICANCE OF LARVAL DEVELOPMENT OF CAUSES OF NEMATODOTIC DISEASES

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Annotation

The manifestation of the resistance of eggs and larvae of strongylates of the digestive tract and respiratory tract of sheep and goats was studied using the examples of marshallagia, nematodes, dictauls to adverse environmental factors. It has been established that eggs and larvae of strongylates developing according to the semi-closed type are more resistant to an aquatic environment containing 3.0; 4.0; 5.0 and 6.0% NaCl than in strongylates whose larvae develop according to the open and semi-open types.

Keywords: Nematodosis, trematodosis, cestodosis, larva, animal, parasite, host, bionematodosis, D. filaria, geonematoda, Marshallagia and Nematodirus.

In the conditions of Uzbekistan, the causative agents of nematode diseases that parasitize in the body of all farm animals are several times greater in the number of species than the causative agents of trematode and cestodose diseases. It depends on the biological and ecological characteristics of their larvae. While all flames and custodes develop in a complex way by changing hosts, most nematodes develop on a single host. Diseases caused by nematodes with this path of development are called geonematodes. Diseases caused by nematodes that progress as a result of changing habits are called bio nematodes.

Nematode larvae that develop correctly multiply twice in the external environment before reaching an invasive state, and after entering the host body, they reproduce again in endogenous conditions. Exogenous larval development of geonematodes occurs in open, semi-open, semi-closed and closed states.

Larvae formed in eggs of nematodes with signs of open development destroy the eggshell and enter the external environment without hatching. Certain abiotic environmental factors (humidity, temperature and oxygen environment) manifest themselves twice within a certain time (several days) and become infectious (invasive) for the host organism. turns into a larva of the third stage. This development is characterized by the main group of pathogens of strongyloidosis, which parasitize the digestive and respiratory organs of ruminant and artiodactyl mammals.

The larva that appears in the eggs of nematodes, which develop by semi-open development, first jumps inside the egg, and the second time - outside it and becomes invasive. An example of nematodes with this level of development is Marshallagia, which lives in the rennet and small intestine of ruminants. In eggs of nematodes with semi-closed development, the larva hatches twice and leaves the egg in an infectious way. Nematodirosis pathogens parasitizing in the small intestine of sheep and goats can be shown to nematodes whose larvae develop in this way.

Nematode larvae with a closed type of development jump inside the egg and do not leave it to become contagious. Thus, pathogens of all ascariasis, oxy-urosis of horses, scriabinematosis of sheep and goats, pathogens of trichocephalosis of sheep, goats, pigs develop. As can be seen from the above, the infection of animals with geonematodes developing open, semi-open and semi-closed pathways of development is manifested by the ingestion of invasive larvae, and some of them even break through the skin. Larvae become active under the influence of favorable environmental factors (humidity, temperature) and move up from the soil through the body of plants, which accelerates their entry into the host body. Under the influence of unfavorable environmental factors of the climate, larvae accumulate from top to bottom - in moist soil areas, in they envelop the roots of plants and even stick to the roots and maintain their viability. Usually in such a situation, expected in the summer season, animals eat the roots of plants that have dried up on pastures, partially mixed with the soil, and as a result they passively become infected with geonematode larvae.

In our study, it was noticed that invasive geonematode eggs, developing by closed development, were transmitted to lambs and goats through the mammary glands of their mothers from the first days. This epizootological situation was determined by detecting the eggs of the pathogen in the manure samples of 45-50-day-old lambs and goats on farms that are extremely disadvantaged by trichocephalosis. Currently, this helminthiasis is one of the most common diseases among sheep and goats. In early March, 50-63 percent of sheep and goats under the age of one year were infected with trichocephalosis in the mountainous foothill zone of the Tashkent region. In their 4 g. from 6 to 32 specimens of Trichocephalus sp. eggs were found.

Infectious nematode larvae that develop open or semi-open pathways of development are resistant to non-infectious larvae that have not fully developed. So, how does the resistance of invasive larvae to extreme conditions arise? In order to shed some light on this issue, in our study we studied the development and resistance of non-infectious, infectious larvae and eggs of some pathogens of dictyoculosis, marshallagiosis and nematodirosis, which develop open, semi-open and semi-closed pathways of development, in a solution prepared with distilled water with different concentrations of table salt. It was noted that the level of soil salinization in our republic is increasing as a result of a sharp violation of the ecological balance in the Aral Sea region. The study used eggs of marshallagia and nematodes isolated from the droppings of sheep and goats with dictyocaulosis, marshallagiosis and nematodirosis, as well as Dictyocaulus filaria larvae isolated in laboratory conditions.

In one of the studies, part of the larvae hatched from D. filaria eggs collected from the respiratory organs - bronchi of infected sheep for 3-8 hours, and immature larval eggs were placed in clean water, the rest in 1.0; 2.0; 3.0; We stored in water with 4.0% NaCl.

Eggs and hatched larvae of D. filaria stored in fresh water

Dead and stunted larvae of D. filaria stored in 2.0% NaCl water

When examined after 4 days, it was found that most of the larvae in 1.0% NaCl water were somewhat active, the rest were very sluggish, their number increased due to hatched larvae, but their development was slow. The larvae contained in fresh water are active, initially peeled from the shell, and the number of larvae increases due to the hatching of larvae from immature eggs. Most of the larvae contained in 2.0% NaCl water showed a significant decrease in activity, and about 30% of the larvae died. The larvae in a 3.0% solution of table salt in water changed various shapes, almost all of them became immobile, only some of them slightly changed the shape of their body from time to time. Larvae in water containing 4.0% NaCl are completely immobile and morphologically unchanged. Observations carried out after 7 and 10 days showed that the larvae, kept in proper conditions, were transferred to the state of invasion. In this case, the larva's body has become transparent and thin, without a shell, and it moves quickly. At the same time, the larvae are also visible, which are about to hatch for the second time. It was noted that some of the larvae contained in 1.0% NaCl water were at the second stage of development, were somewhat sluggish, and in the remaining larvae it was noted that they were about to hatch for the first time. Only 1/4 of D. filaria larvae in 2.0% NaCl water move very slowly, development lags behind, most of the larvae are dead, body deformation is observed. Only 3 of the 114 larvae contained in 3.0% NaCl water developed, and the remaining larvae died. The larvae in a 4.0 percent solution of table salt were killed.

After 15 days, it was noted that D.filaria larvae contained in clean water became completely contagious, they moved quickly, and only some of them moved slowly. We observed that about 90% of the larvae that survived in 1.0% NaCl water became invasive and formed a protective shell after the second molt, but most of them moved slowly, and some of them survived in the form of spirals or rings. Only about 20% of dictyocula larvae in a 2.0% solution of table salt in water remained viable, some of them became infected, and the rest were about to hatch the first and second molts. Larvae that have become infected develop a protective shell. Most of the larvae in 3.0% NaCl water died, but only 2 out of 114 larvae (1.7%) survived. These conditions were found after the transfer of D. filaria larvae from extreme conditions to adequate ones. The experiments were carried out at a temperature of 14-18 °C, distilled water was used in all of them.

Formation of a protective shell by hatched larvae of D. filaria in 1.0% NaCl water

In other studies, larvae hatched from D. filaria eggs were infected in water, and they were exposed to 0.5; 1.0; 1.5; we kept them in a 2.0 and 3.0 percent solution of table salt and one part in clean water under the same conditions for 15 days. Microscopic studies have shown that most of the larvae contained in 0.5- and 1.0-percent salt solution were active, and some of them had a ring-shaped shape and slowly moved in one place, changing their shape from time to time. In a 1.5- and 2.0-percent solution of table salt, it was observed that most of the larvae had the shape of a ring, a crescent and a straight rod, while the remaining larvae retained their shape and moved. Meanwhile, in a 3.0 percent solution of table salt, the larvae became immobile and took the form of chains,

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crescents, straight and curved sticks. In the control group, all D. filaria larvae contained in pure water were active. We found that when the larvae contained in a 3.0 percent solution of table salt were transferred to clean water, that is, to adequate conditions, more than 80 percent of them became active again and retained their viability.

Invasive larvae of D. filiaria kept in 2.0% NaCl water for 15 days

Invasive larvae of D. filiaria kept in 3.0% NaCl water for 15 days

In another experiment, manure samples from sheep infected with marshallagia and nematodiriasis were stored at the institute's training and experimental farm for 5 days at 6-12°C. In the meantime, second-stage larvae emerged from some marshallag eggs, larvae formed in the remaining eggs, and development was delayed in nematodirus eggs. Eggs and larvae of nematodes belonging to the genera Marshallagia and Nematodirus, at this stage of development, were transferred to water containing 1.5% NaCl. On the 4th day of the experiment, under a microscope, it was noticed that the development and activity of the marshallagia larvae that had previously hatched from the eggs slowed down, that the larvae inside the eggs began to move from time to time (within 2-5 minutes) and that the development of the nematodirus slowed down. Eggs was behind. When the checks are returned a week later, do not flip the sorting larvae in one place while moving, larvae were found to have hatched from most of the eggs, but further development of the larvae was delayed. In most of the eggs of the nematode, a larva formed, its body was dark in color, and it was observed that it moved from time to time. During the experiment, the temperature in the room was about 12-16°C.

Larvae of marshallageia hatched from eggs in fresh water

In fresh water, Nematodirus sp. of larvae hatching in the eggs and the larvae that have emerged into the environment

It was found that marshallage larvae kept in a 1.5% aqueous solution of common salt for 17 days slowed down their development, did not become invasive, their movement slowed down, and the larvae in some eggs died. It was observed that the larvae in the nematode eggs continued to develop.

On the 31-32th day of the experiment, at 14-18 °C, it was observed that 1/3 of the marshallage larvae died, the rest did not go into an invasive state, i.e. intestinal cells were not fully formed, intestinal cells were damaged (intestinal cells became wide and chain-like). It was noted that the activity of marshallagia larvae in the living state decreases sharply, they make circular movements in one place or slowly change the shape of their body, often taking the form of a spiral or a straight rod, and from time to time slowly turn their head to the side. We have seen some of them remain in this state for several days. In all nematode eggs, the larvae are at the final stage of development and are about to hatch. From the 34th day of the experiment, larvae in an invasive state began to emerge from nematode eggs, and their movement occurs very quickly. Thus, it was noticed that in water with a concentration of table salt equal to 1.5%, the viability of nematode eggs was maintained for 33 days, and larvae hatched in them, some marshallagia larvae died, the development of the rest was delayed, and their activity decreased.

Larvae of marshallageia stunted and died in 1.5% NaCl water (for 32 days)

The development of the larvae of marshallagia and nematodirus occurs in the external environment, they are very different from each other. For example, in sorting eggs, the larva is formed in optimal (favorable) conditions for 2-3 days, and after leaving the shell it goes to the second stage and enters the external environment, after 7-8 days it hatches a second time and becomes invasive. In nematode eggs, the larva develops for a long time, and it hatches twice inside the egg, becomes infectious and exits the egg. Our experiments have shown that marshallagia larvae developing in a semi-open way are less resistant to a solution of 1.5% table salt in water than nematode larvae developing in a semi-closed way.

In our future experiments, the eggs and larvae of nematodes will be 4.0; We studied resistance to 5.0- and 6.0-percent salt solution. To do this, we used nematode eggs isolated from dying goats with severe nematodirosis. First, we transferred one part of the eggs in which the larvae began to develop in water to clean water, and the other part to a 4.0 percent NaCl solution kept in a thermostat at +28 °C for 4 days. On the 5th day, when the sediment in both cups was examined under a microscope, it was noticed that larvae began to emerge from the nematode eggs in them. After a few hours, the number of larvae hatched from eggs stored in water reached several dozen, they were without protective shells and were in motion. It was noticed that the number of larvae hatched from eggs stored in saline solution was somewhat smaller, their movement was slow, and a special outer shell developed on their bodies.

Larvae of marshallageia hatched from eggs in fresh water

In water with 4.0% NaCl, Nematodirus sp. hatched larva of

In both cases, the eggs and larvae of the parasite were kept in the thermostat for another 2 days. After that, when examining all nematode eggs stored in water, it was found that the larvae were released into the water and they were mobile, about 30% of nematode eggs stored in 4.0% salt solution had incomplete larval development, the larvae died in some eggs, and the larvae that hatched from the egg formed a shell, and some of them had slow movement. After one day, all the larvae formed a highly developed shell, and it was noted that some of them took ring-shaped, crescent-shaped and spiral shapes and from time to time began to move slowly. Nematode larvae lack a shell in the water, and it has been noted that they move very quickly. On the second day, we transferred about half of the larvae from the saline solution to suitable conditions, that is, into fresh water, and left the rest in extreme conditions. We caught larvae that were stored in both cases at a temperature of 18 °C for 8 hours. At the same time, it was noticed that the nematode larvae that were transferred to adequate conditions switched to rapid movement without a shell, and the movement of those who were in extreme conditions slowed down even more. For the first time, we transferred some of the active nematode larvae contained in pure water to a 4.0 percent NaCl solution. After a few hours, it was noted that they had formed a shell, the nature of the movement of the larvae changed, and their activity decreased significantly. When they were moved back into clear water, it was clearly visible that their movement had accelerated and they had lost their shell. When they were transferred to a 4.0 percent saline solution for the second time, the transition was repeated, and in fresh water all the larvae became active again. When the nematode larvae, which had acquired resistance in 4.0% table salt solution, were transferred from pure water to 2.0% table salt solution, it was noticed that they did not lose significant activity and did not form a shell for one day, and on the second day they had a poorly developed shell. they. In a 3.0% solution of salt, such a situation was observed from the first day, the movement of larvae began to slow down.

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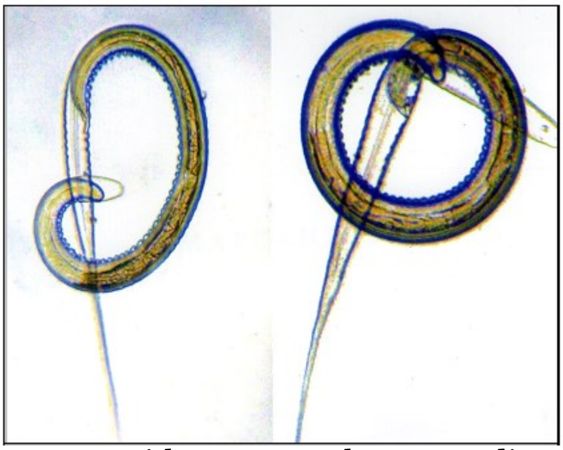
When the nematode larvae contained in constantly moving water are transferred to 5.0% salt solution, they form a highly developed shell after 1-2 hours, and in 6.0% NaCl solution - after 30-40 minutes, after which it solidifies in the form of a ring or a curved rod, a crescent and in 6.0% salt solution in addition, morphological changes were observed, such as thickening of the body part and elongation of the tail part. However, when such larvae are transferred to adequate conditions, it was noted that they move slowly, after 2-3 hours they are released from the shells, but most of them move slowly during observation.

In conclusion, the results of the above studies show that the larvae and eggs of



In water with 5.0% NaCl, Nematodirus sp. body shape change of larvae

In water with 6.0% NaCl, Nematodirus sp. body shape change of larvae

nematodes have the ability to maintain their viability even in extreme conditions, including extremely high salinity and unsuitable soil conditions. In order to adapt to such extreme conditions, both in the external environment and in the internal (in the egg), the larvae have a special protective shell. As the amount of salt in the habitat increases, this shell becomes stronger, the body of the larva becomes somewhat denser inside the shell, and in extreme conditions it takes a different shape, slows down its movements and gradually goes into an anabiotic state. Under the right conditions, they regain their shape and move around without a shell. In accordance with this, it can be considered inevitable that infectious nematode larvae that develop along a closed path of development form a protective shell in extreme conditions.

Geonematode larvae developing open and semi-open pathways of development are less resistant to adverse environmental factors of the environment compared to nematode larvae with a semi-closed pathway of development. All this is an important evidence indicating the wide spread of geonematodes with semi-closed and closed development characteristics in modern environmental conditions, including pathogens of nematodyrosis and trichocephalosis of sheep and goats.

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