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Sheep Miases: Distribution, Pathogenesis, and Control Measures.

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ABSTRACT

The paper presents data on the distribution of miases in sheep in the Stavropol region, the causative agent of which are larvae *Wohlfahrtia magnifica* Schin. Describes the pathogenetic aspects of the impact of parasitic larvae in the host organism and the development of protection measures.

Keywords: miases, parasitic larvae, sheep, pathomorphological changes, host organism, control measures.

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INTRODUCTION

Sheep Myases - Caused by the larvae of a wolfart fly *Wohlfahrtia magnifica* of the family Sarcophagidae (gray meat flies), which parasitize in wounds, ulcers, mucous membranes of the natural openings of animals. Sheep are sick mostly, less often other animals. There are facultative and obligate miases. The genus *Wohlfahrtia* in the world fauna has more than twenty species, in the territory of the Russian Federation nine are registered. This is a relatively under-specialized group, in which coprophages, necrophages, and true parasites are found. The parasitic image is inherent in the preimaginal phases, the adults are free-living. Parasitism of this kind is called larval.

The biology, ecology, morphological features of adults and the preimaginal stages of this genus have not been studied sufficiently so far. If the biology of all *Wohlfahrtia* species were studied, this genus would represent a good example of the repeated occurrence of parasitism within a single genus.

The purpose of research. In sheep breeding, *W. magnifica* is the most important - the miaz pathogen, which occupies an exceptional position because of its harmfulness, the biological features of the development of preimaginal stages. Miaz are widespread and cause sheep farming of the Russian significant economic damage.

In India, up to 24.3% of cattle livestock is affected [2,7]. The damage to Australian sheep breeding is estimated at 15-20 million Australian dollars per year [8]. The economic damage caused by the miaz to N. Zeland sheep breeding is estimated at 1,741 thousand dollars a year [9]. Having been ill, treated for the year, the animals weighed 3-5 pounds less. They produced 5-20 oz less wool, 15% less lambs, 15-44% more weakened runes [10].

The foregoing has determined the purpose of conducting research in this area. The relevance of the work done is due to the need to study the spread and pathogenesis of miases, to develop effective measures to combat them. Scientists have conducted basic research in the study of biology, ecology, phenology of pathogens of infectious diseases [11,5], molecular bases, biocenotic bonds and the evolutionary-genetic theory of parasitism [1,2,8,10,12,13,14,15], structure, strategies, processes of self-regulation, stability of parasitic systems [9,6,7,3,4].

MATERIALS AND METHODS

The object of the study was sheep, spontaneously infested by the larvae of the wolfartic fly. It has been established that in places of the most frequent localization of parasitic larvae of a wolfartic fly in ram producers and walukhs are the prepuce and the base of the horns. In lambs and ewes, myase prevails in the area of the vulva, promezhnosti and anus. In the center of the miaz there are larvae of 3 stages (fig. 1), along the periphery - 2 and 1 stages.



Figure 1: Myasia of the auricle

The larvae inhabit the various organs of animals. In years with a wide spread of necrobacteriosis, the larvae are found in the hooves, in which mixed myases are recorded, the causative agents of which were *Wohlfahrtia magnifica* and *Luzilia serricata*. The larvae of *Luzilia serricata* are located, as a rule, on the periphery and around the wounds, under the fur of animals. Such a distribution seems to be due to the peculiarities of the formation of trophic links of parasitic larvae of the wolfarthap fly with the host.

RESULTS AND DISCUSSION

The spread of miases. Research results and an analysis of the epizootic state indicate the ubiquitous spread of miases in sheep in the steppe zone of the Stavropol Territory. Sheep of all sexually mature groups are affected, especially often producing sheep and walucks, less frequently and with a lower level of extensive invasion of lambs and ewes. It is characteristic that sick, weak animals are invaded more often healthy. The maximum level of extensiveness of invasion often falls on the first and second decades of June. In the third decade of June, during the three decades of July, the number of invasive animals decreases. In the second or third decades of August, a new peak of rise in the level of extensiveness of invasion is formed. In the third decade of October, miases are rarely recorded. The rise in the level of extensiveness of invasion in June is due, apparently, to intensive hatching in a short time of the diapausing generation of a wolfarth fly, which increased traumatization of animals during the shearing period. The sharp decline in the number of invasive animals in the third decade of June and three decades of July, in our opinion, can be explained by the effects of pesticides used as therapeutic and prophylactic agents in farms of the region after shearing.

Pathogenetic aspects of miases. Ontogenesis of the larval phases of *W. magnifica* lasts 5–6 days. Parasites feed on the host's tissues and blood. In the process of miaz development, the larvae secrete the enzymes of the salivary glands into the adjacent tissues of the host, where their hydrolytic effect is realized. The area of the invaded wound in animals is regulated by the level of intensity of the invasion. It is quite obvious that the development of the preimaginal phases of *W. magnifica* so short in time implies intensive feeding of parasites. It has been established that heterotrophic nutrition of parasites is provided by the supply of food resources from the host organism. The composition and mechanisms of consumption of various bioorganic compounds constitute the main part of the parasite metabolism and their relationship with the host.

Factors contributing to the spread of wolfartiosis are: injuries of sheep during shearing, violation of integrity and maceration of the skin. The clinical picture of volphariosis to a significant extent depends on the species, age, individual characteristics, and the general condition of the invasive animals. In the symptom complex of volphartiosis, there is a subclinical, typical, and sublethal course of wolfartiosis.

The subclinical course is characterized by a slight hyperemia of the colonization of the larvae, a serous effusion, which soon dries up, glues the fleece and forms small crusts. The tissue defect is not pronounced. The behavior of invaded animals differs from healthy ones by slight anxiety. Further development of the process is accompanied by an increase in the tissue defect, the size of which is determined by the number of larvae in the wound. Volphartiosis is characterized by predominant damage to the skin and subcutaneous tissue. The enzymatic activity of the larvae in the wound contributes to the deep necrosis of the marginal zone of the miasis. In the lesion, inflammatory processes take place, accompanied by exudative phenomena, deep infiltration of adjacent tissues, formation of crusts. Animals have a strong concern. They often run from place to place, try to get a wound with their teeth, take a sitting dog pose. The sublethal course of tungous disease is characterized by an increase in the area of tissue damage. The process is accompanied by the occurrence of deep necrotic foci. The larvae, by "utilizing" adjacent tissues, make new passages in them, which later form in the cavity, and the partitions between them undergo necrotic decay. An ulcer has a round or oval shape with jagged edges. It exudes a dark-colored exudate with a specific odor, which stains the skin and scalp, which makes the sick animal visible on external examination. There is a strong depression of the animal, the refusal of food. The animals lie more, gradually losing their fatness, in the absence of medical assistance, they bend. The severity of clinical symptoms correlates with the level of intensity of invasion and depends on the location of the miasis.

Histomorphological changes in wolfartiosi are demonstrated: the formation of an extensive destructive process, swelling of adjacent tissues; disorganization of the stroma and structural elements; severe circulatory disorders, plethora, the formation of erythrocyte stasis, erythrocyte aggregation; perivascular hemorrhages,

hydropic dystrophy of cellular elements, tissue necrosis, polymorphonuclear leukocyte infiltration of affected organs and tissues, the presence of blood vessels in the granulation tissue opening into the lumen of a wound defect. In the absence of medical care - sick animals die.

Testing the effectiveness of individual pesticides in miasis. We have tested the effectiveness of diazinon (neocidol, G24480, basudine, C24480) 60%, an organophosphate compound, the active substance - 0.0 - diethyl - 0 - (2 - isopropyl -4-methyl-6-pyrimidyl) - thiophosphate. Cyperyl 5% (synthetic pyrethroid) active ingredient - cypermethrin. Production testing of the effectiveness of pesticides was preceded by the study of their insecticidal and persistent action in the laboratory.

Laboratory tests were performed by forcing the flies of the *Musca domestica* laboratory population on the filter paper treated with the pesticides under study (Table 1). Studies of insecticides have allowed to establish their high effectiveness with sheep miases.

Table 1: Insecticidal properties of individual drugs

The drug, the name, the concentration by active substance (as)	The number of treated animals	The effectiveness of drugs		
		Extens	Intensfectivness	Terms of protective action, the day
Diazinon 60% as, 0.025% emulsion	270	100	100	12
Cyperyl 5% as. 0.01% - as.	135	100	100	18
Control Water treatment	90	-	-	0

Extens and intensfectivness of diazinon and cyperyl (in the indicated concentrations) was 100%, the duration of the protective action, respectively, 12 and 18 days.

CONCLUSION

W. magnifica larvae parasitic in animal wounds cause the development of wolfar-etosis, a severe parasitic disease, often resulting in the death of an animal. Miases are characterized by a complex of more or less pronounced morphological and functional changes. It is known that functional impairments in the body are always closely associated with certain structural changes. There is still no consensus about the pathogenic effect of parasitic larvae on the sheep's body. Only isolated messages are known that illustrate certain aspects of the pathogenesis of this disease.

Emulsions of the 0.025% diazinon and 0.01% cyperyl are highly effective means of treating and preventing miases.

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