

ANNOTATION

thesis for the degree of
Doctor of Philosophy (Ph.D.)
6D060700 - Biology

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Biology, Ecology and control measures against the flies- myiasis former (Wohlfahrtia magnifica) of domestic animals in some areas of Pavlodar region

General characteristics of the work. The thesis is devoted to the study of the current state of biology and ecology- myiasis former flies (as an example, flies Wohlfahrtia magnifica) and finding modern and cost-effective methods of controlling myiasis of Pavlodar region domestic animals.

Relevance of the work

Livestock breeding is one of intense and dynamic branches of the agricultural sector, providing the population and industry of Northern Kazakhstan valuable products and raw materials - meat, milk, wool, hides, etc. For cost-effective livestock development in the market environment need to solve a number of priority tasks. In order to achieve this problem, one of the components, is to provide veterinary animal welfare, especially in such an important industry for the country as a sheep breeding.

In his address to the nation in 2011 President Nursultan Nazarbayev outlined the goals of the Strategic Plan for the next decade, in the agricultural sector, an unprecedented project for the development of cattle breeding will be implemented. Achieving this objective in view of the current situation and prospects for growth in domestic consumption is possible by increasing the breeding and productive qualities of the existing livestock.

Sheep farming country should take its deserved place in agriculture of the country, to become one of the most promising sectors of the domestic livestock, providing the country's population required food, and light industry with raw materials, based on the rational use of the genetic potential of existing and newly created breeds, types and lines of sheep in different directions of productivity.

Large economic losses sheep breeding cause myiasis induced by the larvae of flies zoophilous. Losses due to these invasions are calculated in millions of tenge and fold due to culling of breeding livestock, reducing meat and wool productivity, due to the forced slaughter of sheep and infrequent cases of animal deaths. Ubiquity of myiasis among the sheep in the territory of the Republic of Kazakhstan, as well as outside it dictates the need to further search for the most efficient, economical and environmentally appropriate methods and means of treatment and protection of animals against pathogens of these diseases.

During the period of mass flight of these insects decreased productivity of animals and rapidly deteriorating sanitary quality of agricultural products. In addition, many of zoophilous flies are intermediate hosts of helminths (telyazy,

Setar, stefanofilyary et al.) and disseminate into the environment pathogenic microorganisms - causative agents of dysentery, cholera, anthrax, tuberculosis, and many other.

A resolution of number of issues in different years of the last century has successfully engaged and continue to engage in the that time by following people - I.A.Porchinsky (1916), E.I.Gan (1953), V.I.Sychevskaya (1953,1954,1968,1969) A.P.Goncharov (1967, 1972), V.I.Ternovoy (1960-1962, 1965), E.I.Valentyuk (1969, 1970), I.I.Pokidov (1970-1975,1984) M.K.Kadyrova (1970) A.P.Podmogilnaya (1980,1983,1987) Zh.M.Isimbekov (1983) V.P.Tolokonnikov (1984) V.N.Domatsky (1988.1998) , E.A.Lychagin (1998) I.M.Migunov (1998) and others.

Currently used different methods and a variety of therapies and prevention of myiasis of sheep. Among the latter, to the greatest extent became demand insecticidal preparations, mainly from the group of synthetic pyrethroids.

At the same time protective measures conducted in livestock farms do not provide stable and substantial reduction in the number of parasitic insects to actually harmless level. In this regard, the development of means and methods of protection modification of farm animals from flies zoophilous remains relevant.

Considering the current situation in the of Pavlodar region, where research on the microbiology and the development of measures against the flies in cattle-breeding complexes have not been conducted, we found it necessary to install malicious meaning of these insects in the breeding complexes in the region.

The purpose and objectives of research. The aim of this study was: to study the biology, ecology and control measures designed to protect livestock from myiasis agents in the conditions of Pavlodar region.

In this regard, the following tasks:

- Identify Epizootology myiasis former flies on farms in some areas of Pavlodar region by the example of Wohlfahrtia magnifica;
- Examine the features of the diurnal and seasonal dynamics myiasis flies on the example Wohlfahrtia magnifica;
- To carry out microbiological and mycological study of internal and external integument of flies and their larvae Wohlfahrtia magnifica;
- Develop a system of measures to combat myiasis under conditions of of Pavlodar region;
- Calculate the cost-effectiveness of the use of drugs Karate, Fury, and Blotik Veterin.

Scientific novelty of work. The result of our research data obtained with theoretical and practical significance for agricultural production. For the first time in the region conducted research to identify the daily and seasonal dynamics and phenology myiasis flies on the example of Wohlfahrtia magnifica; microbiological and mycological study volfart flies as carriers of dangerous diseases; studied larvicidal and cost-effectiveness of a number of drugs in sheep myiasis. Tested drugs Karate, Fury, and Blotik Veterin concentration at different doses to determine the optimal effect to combat volfart fly.

The practical significance of the work. The study of daily and seasonal

dynamics of *Wohlfahrtia magnifica*, phenology identified issues epizootology, examined different concentrations of larvicidal products, the results of which formed the basis for the development of recommendations for use in a production environment. Identified calendar dates for the events against *Wohlfahrtia* in conditions of Pavlodar region, calculated economic efficiency of Karate, Fri, Blotik and Veterin drugs in optimal concentrations.

The main provisions of the dissertation are used in the educational process in a lecture course and practical trainings of general parasitology, as well as in the performance of course and degree works by students at Pavlodar state university named after S. Toraigyrov.

Results of the study are introduced into production of "Otan" village of Bayanaul area, the main test provisions included in the recommendations of the "System of actions against myiasis former flies in livestock of Pavlodar region."

On defense are made the following main points

1. In sheep farms of Pavlodar region *Wohlfahrtia* is widespread, *Wohlfahrtia magnifica* - the main causative agent of myiasis, namely *Wohlfahrtia*.

2. The daily and seasonal dynamics depend on environmental factors, such as weather conditions: air temperature, irradiance, wind speed, the presence of precipitation.

3. The allocated groups of microorganisms from external and internal washouts of an imago and larvae are pathogenic and have toxic properties.

4. Synthetic pyrethroids – Karate, Fury, Blotik and Veterin are highly effective protective equipment against a *Wohlfahrtia* fly.

5. Use of medicines of Karate, Fury, Blotika and Veterina significantly increases cost efficiency and constitutes 4 million 878 thousand tenges.

On the basis of the conducted researches and the analysis of results of the obtained data the following conclusions are drawn:

1 The main activator of sheep miaz – a larva of a *Wohlfahrtia* fly. Along with *Wohlfahrtia magnifica*, optional parasites are flies of the *Calliphora* type (*Protophormia terraenovae* R. - D., *Phormia regina* Hg.) and the *Lucilia* type (*Lucilia sericata* Mg., *Lucilia illustris* Mg.). In sheep-breeding farms of the Pavlodar region *Wohlfahrtia* is widespread everywhere, with prevalence in collective farms.

2 The indicator of extensiveness of defeat characterizes by larvae of *Wohlfahrtia magnifica* damage which this disease causes in each certain region, but not in a separately taken farm. The indicator of extensiveness of an invasion for 2011 in Bayanaul district makes 11,4%, the Pavlodar district -13,9%, and in Uspensk district – 13,8%. IE indicator for 2012 of Bayanaul district makes 12,4%, Pavlodar district makes 13,6%, Uspensk district – 13,1%.

3 It is proved that the seasonal and daily rhythm of activity of *Wohlfahrtia magnifica* is defined by weather conditions of the region (air temperature and illumination). Arrival of an imago begins in the second decade of May and stops in the second decade of September. The maximum number of a *Wohlfahrtia* fly is noted in July. Daily activity of an imago falls on 7 hours – 7 hours 30 minutes and

proceeds till 19 hours 30 minutes, reaching the peak by 12-13 o'clock. The highest activity and number of an imago is noted from the third decade of June to July.

4 It is established that are optimum for arrival of an insect: air temperature 25-31C, humidity of 49-64%, illumination of 53-113 thousand lyuk. The rain and wind (over 10 m/s) limit activity of flies.

5 The groups of organisms represented by 3 families of: Bacilaceae (Bacillus, Clostridium, Desulfotomaculum, Sporolactobacillus, Sporosarcina), Micrococcaceae (Staphylococcus), Enterobacteriace (Proteus) from Wohlfahrtia fly caught in the Pavlodar and Uspensk districts. In Pavlodar region marked 11 groups of microorganisms, with a predominance of bacilli and staphylococci; in Uspensk identified 9 groups of microorganisms with prevalence bacilli of bacilli are revealed.

6 When carrying out mycologic researches of a Wohlfahrtia fly 3 types of mushrooms are allocated, a mushroom of the sort Rhizopus sp., 2 types of mushrooms of the sort Aspergillus which have toxic properties not only for insects, but also for warm-blooded.

7 Revealed that Karate preparations at concentrations from 0,03% to 0,1%, Fury - from 0,05% to 1,0%, Blotik - from 0,04% to 0,2%, Veterin – 0,05 % to 0,2% are highly effective means of protection against volfartovoy flies that can be recommended for treatment of wounds from infected animals volfartiozom. The use of these drugs, subject to proper handling is safe for animals.

8 It is found that in treating cutaneous wounds, and hair affected volfartiozom animals Karate preparations (from 0,03% to 0,08%) and Fury (from 0,08% to 0,3%) at the rate of 100 ml per the animal is the most effective Karate medicine with concentration of 0,03% and conditionally effective Fury's medicine with a concentration of 0,08%. It is recommended to carry out handling of animals with a high number of flies at an interval of 1-2 days, and with a moderate number with an interval of 5-7 days.

9 The economic effect of reducing the treatment costs will amount to 2 million 318 thousand tenges. The effect of reducing the loss of peasant (farmer) households from reducing livestock production sales reach 2 million 560 thousand tenges. The net effect will be 4 million 878 thousand tenges.

Recommendations:

Based on the conducted field and laboratory researches of the Wohlfahrtia fly causing miasa of domestic animals the results reflecting an epizootological and epidemiological condition of areas of the Pavlodar region are received. These researches allow offering recommendations about fight against with volfartioz. Recommendations were developed taking into account biological and ecological features of a Wohlfahrtia fly and nature of impact of insecticidal medicines.

1. Carrying out protective sprayings by insecticides of small cattle (sheeps) needs to be performed according to recommendations "System of actions against flies-miases forming in livestock production of the Pavlodar region" (the protocol No. 12 from 18.06.2013).

2. Results of researches are implemented in educational process in the general parasitology course, to lectures and practical trainings, and also in case of

accomplishment of term papers by students of the S. Toraygyrov Pavlodar state university (the protocol No. 1 from 29.08.2016)

3. Results of research work are implemented in production of an peasant farm Otan of Bayanaul district (July, 2012)

4. Results of the carried-out handlings showed that implementation of developed system of actions in practice of farms of various patterns of ownership allow increasing considerably meat and woolen productivity of sheep.

Publications on a thesis On this thesis 8 works are published: 1 in the international scientific publication entering the Scopus company database, 3 articles in the scientific publications recommended by the Ministry of Education and Science of the Republic of Kazakhstan, 1 article in the scientific publication which is a part of the system RCIs, 3 articles in materials of the international and republican conferences, recommendations, acts of implementation in educational process and in production.

Amount and structure of the thesis The thesis consists of 129 pages of the text, illustrated by 19 tables and 47 drawings. Work consists of introduction, the overview of literature, 4 chapters of own researches, the conclusion and findings. The list of the used literature includes 176 sources, including 51 foreign. The annexe includes acts of implementation, the act of testing of medicines.