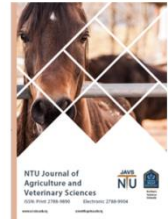




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Review article : Thelaziosis and Filariasis in Iraq

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ABSTRACT

Thelaziosis and Filariasis are zoonotic diseases were caused by nematodes of genus *Thelazia*, and *Felaria* respectively which occur in many countries of the world , and transmitted to human by insects . The current review aimed to investigate the most important previous studies about Thelaziosis and Filariasis in Iraq. A total of 5 *Thelazia* and 24 for Filariasis abstracts and full-text articles of references for several websites collected about infections rates. Tables were created that included general information of species the parasites under the study in Iraq. It was concluded that there is a scarcity of research on these diseases , especially modern research. Only three species of the *Thelazia* were *T.bosc*, *T. lacrymalis* and *T.gulosa* and five species of filariasis were *Dirofilaria immitis*, *D.repens*, *Setraria equine*, *Onchocerca gutturosa*, *O.linealis* in addition to microfilaria in different location of the body have been diagnosed in the country .



INTRODUCTION

Thelaziosis, is a zoonotic disease caused by nematode of genus *Thelazia* which occurs in many countries of the world [1]. Adult worms live in ocular of the definitive host, can be found in several palaces of the eye : under the lids, in nasolachrymal ducts or conjunctiva sacs depending of the species of *Thelazia*, caused some symptoms such as ulcers, conjunctivitis and keratitis. [2], [3]. The female worms lay eggs hatch to larvae 1, they're transmitted to intermediate hosts flies *Musca* spp. by feeding them on secretions of eyes, the flies become infected with larvae1 then developed to larvae3, this stage is infectious phase, develop into the adult stage in the definitive host [2], [3]. Diagnosis is made by detecting the adult of *Thelazia* spp. From the eggs in conjunctiva sacs or larvae in lacrimal secretions.

Filariasis, also was named elephantiasis is caused by worms that causes physical deformities a person can be in enlargement of the extremities, genitals or breasts. When parasites attack the lymph system, the thread worms which are 4-12 cm long, can live and mature in the body's lymph system about 4-6 years. The adult produce other microfilariae that can be transferred to another hosts by mosquito. The filariasis goes through three basic stages: 1- Egg: The microfilaria will transferred to a mosquito where it will be released the eggs, which will turns into larvae takes 7-21 days. 2-Larva: The larvae migrate to the mouth parts of the mosquitoes. the mosquito carrying this larvae to another person, then they are released into the blood circulation of new person. 3-Worm: These microfilaria will be multiplied in the blood circulation and go to the lymph system causing fever which is a first symptoms for recent infections, and then enlargement of other body parts [4]. Other physical symptoms are muscular pain, swelling of the extremities, bad lesions of the skin,

enlargement of the legs or arms also enlargement in breasts, therefore the affected person will suffer difficulty in walking and damage in the kidneys, [5].

The review aimed to investigate the most important previous studies about *Thelazia* spp. and Filariasis In Iraq, to encourage researchers to study this important disease in the remaining unstudied governorates, as well as to update old studies with continuous research and to find out the causes of disease transmission from the researchers' point of view, to reduce subsequent infections of the disease in animals and humans.

REVIEW LITERATURES

A total of 5 about thelaziosis and 24 about filariasis abstracts and full-text articles of references for several websites: Iraq Academic Scientific Journals, Google scholar and social media groups with Iraqi parasitological researchers around the world were collected about infections rates of *Thelazia* spp. and *Filaria* spp.

The tables were created that included the governorates in which the disease was diagnosed, species of *Thelazia* and microfilaria, animals, methods and the rate of infection with this disease in several animals in Iraq. The information arranged from oldest to latest (Tables: 1, 2, 3,4)

Table 1:Review studies of *Thelazia* spp. In Iraq

Governorate	<i>Thelazia</i> spp.	hosts	Methods	rate of infections%	References
Ninevah	<i>Thelazia bosc</i>	Cows	Direct	[6]
Ninevah	<i>Thelazia lacrymalis</i>	Horses	Direct	16.6	[7]
Basrah	<i>Thelazia lacrymalis</i>	drought horses	direct ophthalmologic examination	21.66	[8]
Al-Diwania	<i>Thelazia gulosa</i>	Buffalo	manipulating the orbital membranes	10.22	[9]
Al-Najaf Al-Ashraf	<i>Thelazia gulosa</i>	Buffalo	manipulating the orbital membranes	6.42	[9]
Babil	<i>Thelazia gulosa</i>	Buffalo	manipulating the orbital membranes	3	[9]
Baghdad	Thelaziidae	masked shrike	Dissecting and compound microscope	4 only	[10]

Table 2. Species of *Thelazia* recorded in Iraq

Infection definitive hosts	<i>Thelazia</i> spp.
Cow	<i>Thelazia Bosc</i>
drought horses	<i>Thelazia lacrymalis</i>
Buffalo	<i>Thelazia gulosa</i>

Table 3:Review studies of filariasis In Iraq

Governorate	Types of <i>filaria</i>	Hosts	rate of infections%	Methods	References
Mosul	<i>Setaria equine</i>	horses	8.5	Blood examine	[11]
Baghdad	Microfilariae	bee-eater	2.9	Microscope by stained with Giemsa stain	[12]
Baghdad	Microfilariae	phasianid birds	4.2	Microscope by stained with Giemsa stain	[13]
Baghdad	Microfilariae	falconiform birds	12.4	Microscope by stained with Giemsa stain	[14]
Mosul	Microfilaria	Cattle	%25.76	Knott's concentration	[15]
Karbala	Dirofilaria immitis	Dogs	73%	Blood examine	[16]
Karbala	<i>D. immitis</i>	Dogs	21.4	Histological tests	[17]
Mosul	Microfilaria (<i>Setaria</i> spp.)	Horses	30.76	Blood examine	[18]
Baghdad	Microfilariae	passeriform birds	0.005	Microscope by stained with Giemsa stain	[19]
Mosul	Microfilaria	quail birds	15.5%	wet blood film technique Giemsa stain and knott's.	[20]
Baghdad Sulaimaniy and Diwaniya	Microfilaria	<i>Himantopus himantopus</i>	2.9	Microscope by stained with Giemsa stain	[21]
Karbala	Dirofilaria immitis	Humans	56%	ELISA	[22]
Baghdad	Microfilaria	horse and donkey	5.55%	microscope slides	[23]
Al-Qadisiyah and Dhi-Qar	<i>D. immitis</i>	Herder dogs	40.12	SNAP ELISA	[24]
Mosul	Microfilaria (<i>Onchocerca gutturosa</i> <i>Onchocerca linealis</i> .)	Buffaloes	13.2	Skin examination	[25]
Mosul	Microfilaria	Sheep	70.1%	Knott's concentration, stain Giemsa, Acridine orange flurochrome	[26]
Mosul	<i>Seteria</i>	Buffaloes	100%	Knott's concentration	[27]
Al-Qa'im, Haditha, Rutba,	Cutaneous Microfilaria	Cows	34.0	Skin examination	[28]
Baghdad	(<i>Onchocerca</i> sp)				
Baghdad	Microfilaria	Human	35.92%	Knott Techniqu	[29]
Mosul	<i>Dirofilaria immitis</i>	police dogs	%78.9	Knott's test Ag ELISA	[30]
Mosul	<i>Dirofeleria imitis</i>	Cats	7%	direct ELISA,	[31]
Baghdad	<i>D. immits</i> <i>D. repens</i>	Dogs	44.87%	Knott's test PCR Ag ELISA	[32]
Mosul	<i>Dirofilaria immitis</i>	stray dogs	Knott's technique, serum concentration, and Türk's concentration	[33]
Mosul	<i>Dirofeleria imitis</i>	Dogs	14.4%	<i>Molecular (PCR)</i>	[34]

Table 4: Types of *Filaria* recorded in Iraq

Hosts	Types of filarial
Humans	<i>Dirofilaria immitis</i>
	Microfilaria
Dogs	<i>D. immitis</i>
	<i>D. repens</i>
Horses	<i>Setaria equine</i>
	<i>Onchocerca gutturosa</i>
	<i>Onchocerca linealis.</i>
Cattle	<i>Setaria</i> spp.
	Cutaneous Microfilaria
	Lymphoid Microfilaria
Birds	Microfilaria
Monkey	Microfilaria
Cats	<i>D. immitis</i>

DISCUSSION

These parasites were chosen in this work because both of them are zoonotic nematode that are transmitted to humans or animals by insects, Mosquitoes and flies are the most important biological vectors of diseases such as parasites, bacteria for humans or animals [35, 36]. As well as there are few studies on both parasites under the current work in Iraq, especially in the southern governorates, and this encourages researchers to go towards these abandoned parasites and at the same time important for public health.

The current study noted that studies on Thelaziosis are scarce, especially modern ones, despite the availability of intermediate hosts, which are flies. The highest infection rate was recorded in Basra [8], it was 22.66%, and the lowest in the province of Babylon 3% [9], the reason for the high spread rate in specific areas and its lack in the other may be due to the appropriate environmental conditions for flies such as humidity and appropriate temperatures. Basra is characterized by high humidity due to the presence of the Shatt al-Arab and its proximity to the Arabian Gulf and high temperatures, and these factors help the spread of insects that transmit parasitic diseases, [37] pointed to the high temperatures in Basra especially the center to several factors the most important of which is characterized Basra, including natural and human characteristics that prevented the number, density of population, car traffic and the increase in pollutant concentrations, which led to the difference in the radiation balancing as well as the presence of greenhouse gases in the atmosphere of the city of Basra, which led to the emergence of global warming, especially in its center. Through this review, we urge all researchers throughout Iraq to study the epidemiology of the disease in all provinces because of its important role in injury of the eye, which is a sensitive part of the body, which may cause economic losses.

Or the reason may be due to the lack of recent studies or their absence in many areas, this review could be a discovery of a disease that has not been drawn attention in despite of the seriousness of the disease and its great importance. There must be many studies using modern methods to diagnose species and genetic mutations, such as the technique of PCR and the gene sequencing, Nematodes are widely used in studies for the shortness and simplicity of their life cycle [38].

the current review was noted very few research about filariasis in the southern governorates, does not exist in some such as Missan and Al-Basrah, it showed the lack of research in the centre and the north, as well as no research about the spread of the disease in humans and farm animals. The highest infection rate of felariasis was recorded in Mosul [27, 30], were 100%, 78.9% respectively and Karbala 73% [16], the lowest in Baghdad 0.005% [19], 5.55% [24], The reason for these large differences between the rates of infection between the provinces may be due to the scarcity of modern and old studies and the presence of a large number of places in Iraq that are still not studied until now, this is confirmed by the current review, or may be due to the time of the study and the appropriateness of the study time with the growth of mosquitoes causing the disease, as mosquitoes breed increases at certain times of the year, Mosquito breeding increases in specific seasons, such as mosquito breeding increases in March and April [39].

CONCLUSION

Very few species of *Thelazia* and *Filaria* have been discovered, twelve and ten provinces have not been researched about the parasite under the review. only three species of *Thelazia* and five with microfilaria only diagnosis in Iraq more than 20 years ago.

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