

Parasitic Infection in Wild Rabbits *Oryctolagus Cuniculus*

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ABSTRACT

The purpose of current study is the Biochemical detection of parasitic infection in wild rabbits *Oryctolagus cuniculus* and illustrate which one of these parasites can infect humans or economical animals to clarify the important role of rabbits in the transmission of these parasites (as a vector and/or a reservoir host). During the period October 2016 to December 2017, a total of 55 samples of wild rabbits were collected from the local animals market in Al-Diwaniyah province – Iraq, of both sexes with different ages. After dissection and examination of all rabbits to look for ectoparasites infestation and endoparasites infection, then these parasites were prepared according to suitable methods. Results shown that 41 rabbits (74.55%) were infected with eight different types of external and internal parasites. Our results showed three species of external parasites (ectoparasites): the rabbit ear mite *Psoroptes cuniculi* (25.45%), the poultry red mite *Dermanyssus gallinae* (30.91%) and nymphs of *Linguatula serrata* which belong to the tongue worms (21.82%); and also we found five species of internal parasites (endoparasites) which were: the protozoan *Eimeria* sp.(61.82%), *Giardia* sp.(16.36%) and *Cryptosporidium cuniculus* (38.18%), and the larva stage *cysticercus pisiformis* (54.55%) and finally the nematodes *Passalurus ambiguous* (32.73%). The results in this biochemical study revealed that rabbits can be infected with common parasites which are: *D. gallinae* (poultry red mite), nymphs of *Linguatula serrata*, *Eimeria* sp. and *Giardia* sp. these parasites can infected anther hosts beside rabbits. So that our results enhance the important role of rabbits in the spreading of parasites and transmission of infection to other animals as well as humans.

Keywords: parasitic infection, ectoparasite, endoparasite, wild rabbits

INTRODUCTION

Wild rabbits *Oryctolagus cuniculus* are an economically important animals and it was widely used in scientific researches that concerned with pharmacology, immunology, and physiology and it also plays an important role in zoonotic diseases [1]. Rabbits are exposed to various parasitic infections during their lifetime. They act as intermediate or final hosts for these infections [2, 3]. Several biochemical studies have been conducted on ecto and/or endoparasitic infection in wild rabbits around the world. [4] indicated existence of larva *cysticercus pisiformis* which belong to the tapeworm *Taenia pisiformis* in the peritoneum cavity of rabbits; [5] reported that rabbits act as intermediate host of *Linguatula serrata* which is a species of external arthropods that settle in the dog's respiratory ducts and that the evolutionary stages of these arthropods settle in the large intestine of rabbits, [6] gave a detailed description of the most important tapeworms that can infect pet rabbits. While [7] reported that rabbits were infected with pinworm *Passalurus ambiguous* at rate (49.65%), also [8] reported 12 different species of rabbit worms, the most important of which are the cestodes: *Cittotaenia ctenoides*, *Cittotaenia pectinata*, Nematodes: *Nematodirus zembrae*, *Trichostrongylus retortaeformi*, *Graphidium strigosum*, and the larva *Cysticercus pisiformis*. On the other hand [9] found wild rabbits infected with two types of protozoa *Cryptosporidium cuniculus* and *Giardia duodenalis* at rate 22.38% and 7.41% respectively.

Table 1. Percentage of infection for the total, ecto and endoparasites which isolated from wild rabbits (Total No. = 55)

Type of parasite	No. positive	% of positive
Ectoparasite	23	41.82
Endoparasite	36	65.45
Total	41	74.55

Locally, a few biochemical studies and researches conducted on rabbits' parasitic infection. [10] examined 1500 rabbits to identify the most common diseases, they found that the rate of infection of rabbits with eggs of stomach and intestinal worms was 13.3%, oocysts of *Eimeria* spp. with an infection rate at 28% and two species of mites which causes scabies: *Sarcoptic scabiei* and *Psoroptes* sp.

Other biochemical studies have shown infection of domestic rabbits with several endoparasites with a total infection rate 46.66% which were: two types of protozoa: *Eimeria magna* and *E. steidae*, one type of cestoda (larvae of *Cysticercus pisiformis*) and three types of nematodes were recorded: *Passalurus ambiguus*, *Nematodirus leporis*, *Trichostrongylus retortaeformis* [11]. Another study has shown that two types of external arthropods were isolated from rabbits: *Dermanyssus gallinae* and *Cheyletiella parasitivorax* [12]. Recently, the importance of rabbits has increased in our countries because they are depending on their meat as a source of food, and some Europe and Arabian countries have established breeding farms for rabbits such as: the United Kingdom, Germany, French, Spain, Syria and Egypt.

Because of wild /or domesticated rabbits considerable an intermediate and final hosts for many types of parasites, therefore it becomes a threat to the public health of humans and other animals, so that our biochemical study aims to investigate the types of ecto- and endo-parasites which infected rabbits, demonstrate the percentage of these infections and illustrate which one of these parasites can infect humans or their economical animals.

MATERIAL AND METHODES

Collection of Samples

The current biochemical study included 55 samples of wild rabbits which purchase from the local animals market in Al-Diwaniyah province – Iraq of both sexes with different ages, during from October 2016 to December 2017. The samples were placed in cages that made for breeding of laboratory rabbits until their dissection. Number of species, number of parasites which isolated from each sample were recorded.

Examination and Dissection of Rabbits

The rabbits were anesthetized by using chloroform and then rabbit's hear was examined, especially near ear, nose and upper parts of legs, to investigate infestation of ecto-parasites which preservative in 70% ethanol until preparation [13]. After that, all rabbits were dissected and examined to look for internal parasites. After preparation, by using stains such as iodine stain, Acid fast stain (MZN) to reveal some protozoa , all slides were examined microscopically under X40 and X100 [14].

Statistical Analysis

The results were statistically analyzed by using chi-square at $P \leq 0.05$ on using SSPS program.

RESULTS AND DISCUSSION

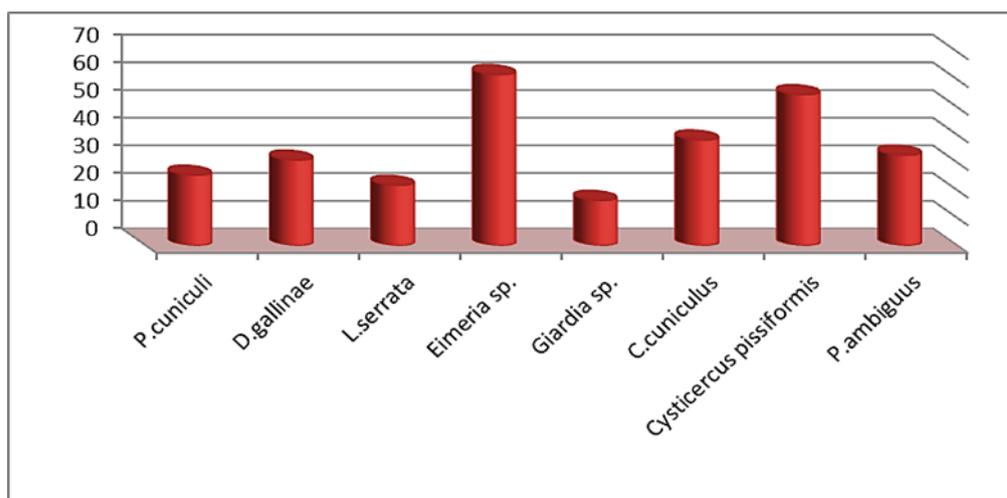
The results of the present biochemical study showed that 41 specimens out of 55 rabbits were infected with both of external and internal parasites with a total infection rate 74.55%. 23 (41.82%) out of 55 rabbits were infected with ectoparasites, and 36 (65.45%) out of 55 rabbits were infected with endoparasites (**Table 1**).

The results which appeared in **Table 1** showed that the total infection rate in the rabbits under biochemical study was 74.55%, which is a high infection rate. This result gives an important health indicator, because the wild rabbits can be considered a source of continuous and transmission of these parasites to other animals besides of humans.

The results in **Table 2** showed that wild rabbits infected with eight different species of parasites which were : three types of ectoparasites: *Psoroptes cuniculi* (rabbit ear mite) (25.45%), *Dermanyssus gallinae* (poultry red mite) (30.91%) and nymphs of *Linguatula serrata* which belong to the tongue worm (21.82%) ; and five types of endoparasites which were: the protozoan *Eimeria* sp. (61.82%) , *Giardia* sp. (16.36%) and *Cryptosporidium cuniculus* (38.18%), and the larva stage *cysticercus pisiformis* (54.55%) and the nematodes *Passalurus ambiguus* (32.73%).

Table 2. Types of ecto and endoparasites which isolated from wild rabbits

Group of parasite	Species of parasite	No. of infection	% of infection
Ectoparasites	<i>Psoroptes cuniculi</i>	14	25.45
	<i>Dermanyssus gallinae</i>	17	30.91
	Nymph of <i>Linguatula serrata</i>	12	21.82
Endoparasites	<i>Eimeria sp.</i>	34	61.82
	<i>Giardia sp.</i>	9	16.36
	<i>Cryptosporidium cuniculus</i>	21	38.18
	<i>Cysticercus pisiformis</i>	30	54.55
	<i>Passalurus ambiguus</i>	18	32.73

**Figure 1.** The percentage of parasites which isolation from wild rabbits

The percentage of parasitic infections in wild rabbits (Figure 1) appeared that *Eimeria sp.* (61.82%) and *Cysticercus pisiformis* larvae (54.55%) which belonging to *Taenia pisiformis* had the highest infection rate, while the protozoan *Giardia sp.* had the lowest infection rate (16.36%). The results showed significant differences between the highest and lowest rate of infection at $P \leq 0.05$.

The results of the current study were concurred with several studies that recorded infection with these parasites in both domesticated and wild rabbits, such as [15]; [16]; [17] and [18] which found rabbits' infection with [19]. Other studies have shown the high rate of infection with *Cysticercus pisiformis* in wild rabbits [20], as well as many studies recorded infection with pinworm *P. ambiguus* in rabbits [21]. On the other hand, this results consistent with many studies that have documented high rates of infection in rabbits, such as: [22], while others have reported low rates of infection such as [23] which recorded infection rate at 46.66% in Azerbaijan and 33.8% in Heilongjiang respectively. The differences in the rates of infection between this biochemical study and others may be due to several reasons, including: the areas allocated for raising rabbits and their suitability in health conditions, the degree of contamination of the rabbits' food as well as drinking water. These factors affect in an incidence and prevalence of parasitic infection [24].

Also, some parasites have the same sources of transport such as water and food contaminated with infective stages like mature cyst, oocyst and eggs. This increases the possibility of the incidence of common parasitic infection and demonstrates the absence of antagonism between these parasites, especially intestinal parasites, as in the case of infection with [25]. Some studies have pointed out that the incidence of parasitic infections is more likely to be affected by other species of parasites due to the weakened resistance of the animal's body to other pathogens. Some cases reported that infection with intestinal worms helps in the occurrence of chronic infections in intestinal protozoa in the order lagomorpha [26].

Current biochemical study shown some parasites which isolated from rabbits can infect another hosts, for example [27] which called poultry red mite, is considerably the most damaging ectoparasite of laying chickens, and his prevalence reach to 94% in Belgium, Germany, Netherlands and Austria [28]. Also in some cases, humans may be infected with the nymph of [28] through ingestion of the nymph and this case named linguatulosis or Halzoon syndrome, human infection with this parasite had been reported in different places in Iran [29]. And with regard to the protozoan *Eimeria sp.* and *Giardia sp.* these protozoa can infect other animals like hens, goats, sheeps and buffaloes [30, 31, and 32].

So that, the presence of common parasitic infections between rabbits and other animals as well as humans enhances the important role of rabbits in the spreading of parasites widely, and transmission of infection among them.

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