Ibn Al-Haitham Journal for Pure and Applied science https://doi.org/ 10.30526/2017.IHSCICONF.1782

Checklists of Parasites Stray Cats Felis Catus of Iraq

Abdul-Rahman Aziz Al-Tae
dr.altae@gmail.com
Dept. of Microbiology, College of Medicine AL-Iraqia University
Abdul-Razzak L. Al-Rubaie
Dept. of Biological Control Technology, Al-Musaib Technical College,
Al-Furat Al-Awsat Technical University, Al-Musaib, Iraq

Abstract

The literature reviews of all reports of parasites fauna cats Felis catus in Iraq species of including 15 protozoa (*Babesia* spp., *Crptosporidium* spp., *C. muris*, *C. parvum*, *Cytauxzoon felis*, *Eimeria cati*, *Entamoeba* spp., *Giardia* sp., *Giardia* spp., *Isospora* ssp., *I. felis*., *I. rivolta*, *Leishmania tropica* and *Toxoplasma gondii*), five trematoda (*Heterophyes aequalis*, *H. heterophyes*, *Opisthorchis felineus*, *O. tenuicollis* and *Paragonimus killicotti*), 17 cestoda (*Diphyllobothrium* sp., *D. latum*, *Diplopylidium acanthotetra*, *D. nolleri*, *Dipylidium* spp., *D. caninum*, *D. sexcoronatum*, *Hydatigera taeniaeformis*, *Joyeuxiella echinorhyncoides*, *J. pasqualei*, *Mesocestoides variabilis*, *Spirometra* sp., *S. erinaceieuropaei*, *S. mansonoides*, *Taenia* sp., *Taenia* spp. and *T. taeniaeformis*), 18 nematoda) *Aelurostrongylus abstrusus*, *Ancylostoma* spp., *A. paraduodenale*, *A. tubaeforme*, *Capillaria* spp., *C. arophilia*, *C. felis*, *Dioctophyma renale*, *Dirofilaria immitis*, *Ganathostoma* sp., *Ollulanus tricuspis*, *Physaloptera praeputiale*, *Pterygodermatites cahirensis*, *Rictularia cahirensis*, *Strongyloides* spp., *Toxascaris leonine*, *Toxocara* sp. and *T. cati*) and seven arthropoda (*Ctenocephalides felis*, *Felicola subrostratus*, *Ixodes* spp., *Otodectes cynotis*, *Rhipicephalus* sp., *R. sanguineus* and *R. turanicus*).

Keyword: *Felis catus*, Cats, Parasites, Iraq .

1. Introduction

Cats are widespread all over the world, because of their high capacity to adapt to live in different environments and are one of the most common domestic animals in the United States are estimated to prepare limits of 60 million cats. Stray cats in Iraq are widespread inside houses and public places, the source of many diseases to the public and animal health by acting as reservoirs and carriers of many endoparasites and ectoparasites by transporting worms eggs, larvae and cyst protozoa to humans and animals most common parasites zoonotic humans and cats were *Toxocara cati* [1; 2; 3; 4; 5; 6; 7; 8; 9; 10; 11; 12] and *Toxoplasma gondii* [11; 12; 13; 14; 15; 16; 17; 18; 19] which transmitted to humans embryonated egg of *T. cati* oocyst of *T. gondii* through cats feces of soil houses and parks.

The aim of this study is to provide research on the prevalence of stray cat parasites in Iraqi Provinces to identify parasitic species of protozoa, tremtoda, cestoda, nematoda and arthropoda to be a database on the seriousness of stray cats on public health.

Sources and Methods

Parasites were arranged according to their taxonomic class to scientific reference [20; 21; 22] and three electronic sites concerned with parasite classification [23; 24; 25].

Results and Discussion

The review of literature indicated that a total of 62 valid species
included 15 species of protozoa, five species of trematoda, 17 species of cestoda, 18 species of nematoda and seven species of arthropoda are so far known from of stray cats in the provinces of Iraq.

Iraq Recorded parasites species classified according to their taxonomic location	
Phylum Amoebozoa	Phylum Sarcomastigophora
Class Archamoebae	Class Zoomastigophora
Family Entamoebidae	Order Diplomonadida
Entamoeba spp.	Family Hexamitidae
Phylum Euglenozoa	*Giardia* spp.
Class Kinetoplastida	Phylum Apicomplexa
Order Trypanosomatida	Class Aconoidasida
Leishmania tropica Wright, 1903	Order Piroplasmida
Babesia spp.	Family Babesiidae
Order Achromatorida	**Class Cestoda**
Family Theileriidae	Order Cyclophyllidea
Cytauxzoon felis Kier, 1979	Family Dipylidiidae
Class Conoidasida	*Diplopylidium acanthotetra* (Parona, 1887) Beddard, 1913
Order Eucoccidiorida	*Diplopylidium nölleri* Skrjabin, 1924
Family Cryptosporidiidae	*Dipylidium caninum* (L., 1758) Leuckart, 1863
Crptosporidium spp.	*Dipylidium sexcoronatum* von Ratz, 1900
Cryptosporidium muris Tyzzer, 1907	*Dipylidium* spp .
Cryptosporidium parvum Tyzzer 1912	Family Taeniidae
Family Eimeriidae	*Taenia* sp.
Eimeria cati Yakimoff, 1933	*Taenia* spp .
Isospora felis Wenyon, 1923	Taenia taeniaeformis (Batsch, 1786)
Isospora rivolta (Grassi, 1879) Wenyon, 1923	*Hydatigera taeniaeformis* (Batsch, 1786) Lamarck, 1816
Isospora spp .	Family Dilepidida
Family	*Joyeuxiella echinorhyncoides* (Sonsino 1889)
Toxoplasma gondii (Nicolle & Manceaux, 1908)	
Phylum Platyhelminthes	

Class Trematoda	Fuhrmann, 1935
Order Opisthorchiida	*Joyeuxiella pasqualei* (Diamare, 1893) Schmidt, 1986
Family Heterophyidae	Family Mesocestoididae
Heterophyes aequalis Looss, 1902	*Mesocestoides variabilis* Müller, 1927
Heterophyes heterophyes (Siebold, 1853)	Order Diphyllobothriidea
Order Plagiorchiida	Family Diphyllobothriidae
Family Opisthorchiidae	*Diphyllobothrium latum* (L., 1758) Lühe, 1910
Opisthorchis felineus (Rivolta, 1884) Blanchard, 1895	*Diphyllobothrium* sp .
Opsithorchis tenuicollis (Rudolphi, 1819) Stiles & Hassall, 1896	*Spirometra erinaceieuropaei* (Rudolphi 1819)
Family Troglotrematidae	*Spirometra mansonoides* (Rudolphi, 1819) Mueller, 1937
Paragonimus killicotti Ward, 1908	*Spirometra* sp.
Phylum Nematoda	*Rictularia cahirensis* Jägerskiöld, 1904
Class Adenophorea	Order Strongylida
Order Trichurida	Family Ancylostomatidae
Family Capillariidae	*Ancylostoma paraduodenale* Biocca, 1951
Capillaria arophilia (Creplin, 1839)	*Ancylostoma* spp .
Capillaria felis (Diesing,. 1851)	*Ancylostoma tubaeforme* (Zeder, 1800)
Capillaria spp .	Family Molineidae
Class Secernentea	*Ollulanus tricuspis* Leuckart, 1865
Order Ascaridida	Phylum Arthropoda
Family Dioctophymatidae	Class Insecta
Dioctophyma renale (Goeze, 1782)	Order Siphonaptera
Family Toxocaridae	Family Pulicidae
Toxascaris leonine (Linstow, 1902) Leiper 1907	*Ctenocephalides felis* (Bouché, 1835)
Toxocara cati (Schrank, 1788) Brumpt, 1927	**Order Phthiraptera**
Toxocara sp.	Family Trichodectidae
Order Rhabditida	*Felicola subrostratus* (Burmeister, 1839) Ewing, 1929
Family Angiostrongylidae	**Class Arachnida**
Aelurostrongylus abstrusus (Railliet, 1898)	**Order Astigmata**
Family Strongyloididae	Family Psoroptidia
Strongyloides spp .	Otodectes cynotis (Hering, 1838) Canestrini, 1894
Order Spirurida	Order Ixodida
Family Gnathostomatidae	Family Ixodidae
Ganathostoma sp .	*Ixodes* spp .
Family Onchocercidae	*Rhipicephalus sanguineus* (Latreille, 1806)
Dirofilaria immitis (Leidy, 1856)	*Rhipicephalus* sp .
Family Rictulariidae	*Rhipicephalus turanicus* Pomerantzev, Matikashvily and Lototsky, 1940
Physaloptera praeputiale von Linstow, 1889	
Pterygodermatites cahirensis (Jägerskiöld, 1909) Barus, Petavy, Deblock et Tenora, 1996	

The literature review of all reports of parasites fauna of cats *Felis catus* Linnaeus, 1758 in Iraq showed the occurrence of 62 valid species so far known in Iraq in addition to some unidentified specimens of some genus. The following is an account of such parasites in Iraq with a short profile of each parasite Phylum Amoebozoa

Class Archamoebae

Entamoeba spp. were found as internal parasites of animals, observed in stray cats of Diwaniya [26]. Phylum Euglenozoa

Class Kinetoplastida

Leishmania tropica Wright, 1903 is a flagellate parasite that is the cause of a skin lesion (Cutaneous leishmaniasis). It is transmitted by the bite of sand fly. It was recorded of cats in Baghdad [27].

Phylum Sarcomastigophora class Zoomastigophora *Giardia* sp. found in the small intestine of man, it has also found animals as cats. It was observed in stray cats of Baghdad [28] and Diwaniya provinces [26].

Giardia spp. Different specimens of unidentified Giardia were reported from different provinces of Iraq, from stray cats of Baghdad [28; 29], Al-Diwaniya [26]. Al-Mosul [30] and Salahuddin [12].

Phylum Apicomplexa

Class Aconoidasida

This parasite was appeared in the cats of Al-Mosul [31] and Al- Diwaniya [11].

Cytauxzoon felis Kier, 1979 transmitted to cats through a tick bite, the life cycle includes all of the tissues and red blood cells. [31] found this parasite in the infected cats in Mosul province.

Class Conoidasida

Crptosporidium spp. are protozoan parasites cause of gastrointestinal disease infectious all mammals. This parasite was recorded from cats in Baghdad [29]. Lateron, it was recorded in Al-Mosul [30].

Cryptosporidium muris Tyzzer, 1907 is sporozoan that inhabits microvillus of mucous membranes of mammals. [28] found stray cats of Baghdad infected with this parasite.

Cryptosporidium parvum Tyzzer, 1912 This parasite caused a diarrhea disease in man and other vertebrates. [28] reported this parasite infected stray cats of Baghdad cats and [26] pointed to infect of stray cats in Al-Diwaniya *Eimeria cati* Yakimoff, 1933.

This parasite infected both cat and dog unknowns.

Isospora sp:. This parasite caused diarrhea disease in different mammals. This parasite was recorded from cats in Baghdad [28; 9] and in Erbil province [19].

Isospora spp. that species cause coccidiosis in several mammals, especially cats and dogs. [29] said some spices infect cats in Baghdad [12] found stray cats infected in Salahuddin province *Isospora felis* Wenyon, 1923

This parasite infected both dogs and cats caused diarrhea that leads to the death of small cats, This parasite was reported in three provinces so far known in Iraq, these are: Baghdad [32], Al- Mosul [13; 15] and Al- Diwaniya

Isospora rivolta (Grassi, 1879) Wenyon, 1923

This parasite infected intestines of both dogs and cats. [32] recorded this parasite in Baghdad.

Toxoplasma gondii (Nicolle & Manceaux, 1908) is an obligate parasite of mammals and bird caused toxoplasmosis. This parasite was reported in many provinces in Iraq: Mosul [13; 14; 15; 16], Baghdad [7; 18; 28; 33; 34], Al-Diwaniya [11; 17; 34], Erbil [19], Kirkuk [35], North Iraq [18], Salahuddin [12] and West Iraq [18].

Phylum Platyhelminthes

Class Trematoda

Heterophyes aequalis Looss, 1902 This parasite infects the small intestines of cats, [8] reported this parasite infected cats in the province of Basrah.

Heterophyes heterophyes (Siebold, 1853) This parasite of humans in the Near and Far East of the world where raw fish are eaten. It was found in the intestine of dogs, cats, foxes and humans. [8] saw recorded this parasite in stray cats of Basrah.

Opisthorchis felineus (Rivolta, 1884) Blanchard, 1895.
It is a parasite affects species of mammals, especially cats, it was called cat live fluke. This parasite was reported for the first time in small intestines of cats in province of Basrah [8].
Opsithorchis tenuicollis (Rudolphi, 1819) Stiles & Hassall, 1896. A parasite infects vertebrates, including cats, it was found in the bile ducts and small intestines. [35] the first record was in Baghdad.
Paragonimus killicotti Ward, 1908. These parasites infect lungs of cats and dogs. Adult flukes have thick oval-form bodies. [38] record these parasites in Mosul.
Class Cestoda
Diplopylidium acanthotetra (Parona, 1887) Beddard, 1913. It has a few rows of hook with the guard and handle well developed. It is found in Baghdad [2; 3; 6; 10], Kirkuk [2; 3], Al-Najaf [3], Basrah [8] and Diwaniya [11].
Diplopylidium nölleri Skrjabin, 1924. Usually found in very posterior of small intestine of cat parasite was in the Basrah [8; 38], Mosul [1; 37], Babylon [9] and Diwaniya [11].
Dipylidium caninum (L., 1758) Leuckart, 1863 occurs in the small intestine of cats, dogs and humans. It was in Baghdad [2; 3; 6; 7; 10; 29], Kirkuk [2; 3], Al-Najaf [3], Mosul [13; 15; 38], Babylon [9], Erbil [19], Diwaniya [11] and Salahuddin [12].
Dipylidium sexcoronatum von Ratz, 1900. occurs principally flea. [1] found in the cats of Mosul.
Dipylidium spp. These parasites were found in cats of Baghdad [7].
Taenia sp. [29] these parasites in cats of Baghdad.
Taenia spp. parasites cats of Baghdad [7] and Salahuddin [12].
Taenia taeniaeformis (Batsch, 1786) Also known as: *Hydatigera taeniaeformis*, *Taenia crassicollis*, *Cysticercus fasciolaris* and *Strobilocercus fasciolaris*. It occurs in small intestine of the cat and other carnivores. It was found in Mosul [1; 13; 15], Baghdad [2; 3; 6; 10], Kirkuk [2; 3], Al-Najaf [3], Basrah [8; 37], Babylon [9] and Diwaniya [11].
Joyeuxiella pasqualei (Diamare, 1893) Schmidt, 1986 is a tapeworm commonly found in cats. The lives in the small intestine of the cat and carnivores. These parasites in the Basrah [39], Mosul [1; 38], Baghdad [2; 3; 6; 10] Kirkuk [2; 3], Al-Najaf [3] and Babylon [9].
Mesocestoides variabilis Müller, 1927. The small intestine of cat and other carnivores. [38] the Mosul.
Diphyllobothrium latum (L., 1758) Lühe, 1910 it occurs in man, cat and dog when plerocercoids produce from wild animals are taken with inadequately cooked fish. It was found in Baghdad [6; 10] and Diwaniya [26].
Diphyllobothrium sp. was found in Mosul [37] and Salahuddin [12].
Spirometra erinaceieuropaei (Rudolphi 1819) This is found in cats and dogs This parasite was reported for the first time in Basrah [8] *Spirometra mansonoides* (Rudolphi, 1819) Mueller, 1937.This parasite infects in the cat, dog and bobcat. . This parasite was Mosul [1, 38].
Spirometra sp. This parasite was reported in Basrah [41].
Phylum Nematoda
Class Adenophorea
Capillaria arophilia (Creplin, 1839)
This is a nematode parasite of lungs of dog, cat and fox direct. This parasite was reported for the first time in Mosul [38].
Capillaria felis (Diesing,. 1851) [28] reported this parasite in Baghdad.
Capillaria spp. This parasite was reported in the cats of Baghdad [29].

Class Secernentea
Dioctophyma renale (Goeze, 1782)
This parasite is the largest nematode, of mammalians such as cat and dog in the kidneys and other organs. This parasite was reported for the first time in Al- Mosul [38].
Toxascaris leonine (Linstow, 1902) Leiper 1907
This adult nematode infects the small intestines of dogs cats and dogs.
It was reported in the Baghdad [4; 5; 10; 29; 42], Al-Anbar (42; 43; 44; 46], Al-Basrah [8], Al-Mosul [38], Babylon [9] and Salahuddin [12].
Toxocara cati (Schrank, 1788) Brumpt, 1927 This parasite infects the small intestin of cats. It was reported in Al-Mosul [1; 13; 15; 37], Baghdad [2; 3; 4; 5; 6; 7; 10; 28; 29; 42; 43; 47; 48], Al-Anbar [44; 45; 46], Al-Basrah [8], Salahuddin [12; 47], Babylon [9] and Al-Diwaniya [11; 26].
Toxocara sp.This parasite was reported in Al-Mosul [49] and in Erbil [19].
Aelurostrongylus abstrusus (Railliet, 1898)
This parasite infects the lungs of cats is occur in the lungs of the cat. The adult lives in the respiratory bronchioles of cats. This parasite was reported in Mosul [13; 15] and Baghdad [29].
Strongyloides spp. A parasite infects reptiles, amphibians, birds and mammals. This parasite was reported in Al-Diwaniya [11].
Ganathostoma sp. This parasite affects mammals including cats. [38] reported it in the Al-Mosul.
Dirofilaria immitis (Leidy, 1856) This parasite infects both cat and dog, It was reported in the Al-Diwaniya [11].
Physaloptera praeputiale von Linstow, 1889 This parasite infects in the stomach of the cat. This parasite was reported in the Al-Mosul [1; 13; 15; 38], Baghdad [2; 3; 6; 10; 29], Kirkuk [2; 3], Al-Najaf [3], Basrah [8] and Diwaniya [11].
Pterygodermatites cahirensis (Jägerskiöld, 1909) Barus, Petavy, Deblock et Tenora, 1996 (synonym) *Rictularia cahirensis* This parasite was reported in theAl-Mosul [1], Baghdad [2; 3; 6; ; 10], Kirkuk [2; 3], Al-Najaf [3], Al-Basrah [8] and Babylon [9].
Ancylostoma paraduodenale Biocca, 1951 This parasite infects cats of Mosul [1; 13; 15].
Ancylostoma spp.These parasites were reported in Baghdad [29] and in Al-Diwaniya [26].
Ancylostoma tubaeforme (Zeder, 1800) This parasite infects occurs in the intestines of cats, It was reported found in Al-Mosul [38], Babylon [9] and Baghdad [28]
Ollulanus tricuspis Leuckart, 1865 This parasite infects the stomach of cats. This parasite was reported in the Al-Mosul [13; 15; 38].
Phylum Arthropoda
Class Insecta
Ctenocephalides felis (Bouché, 1835) This parasite infects many species of domestic animal and represent as a vector for many parasites such as protozoa and helminthes. This parasite was reported in the cats of Al-Mosul [13; 14], Baghdad [29] and Al-Diwaniya [11].
Felicola subrostratus (Burmeister, 1839) Ewing, 1929 This parasite is the only louse that infects cats. [29] reported this parasite on the cats in Baghdad.
Class Arachnida
Otodectes cynotis (Hering, 1838) Canestrini, 1894 This parasite infects in the ears of the cat, dog and fox. It was reported in the Baghdad [7].
Ixodes spp. This parasite infects many species of animals and humans. [29] reported in the Baghdad.

Rhipicephalus sanguineus (Latreille, 1806) This tick was reported in the cats of Baghdad [7] and Al-Diwaniya [11].

***Rhipicephalus* sp.**

This tick is a parasite of medical and veterinary importance. being a transmit
of human and animal pathogens that cause human and animal diseases. It was reported and found in the cats of Baghdad [29].

Rhipicephalus turanicus Pomerantzev, Matikashvily and Lototsky, 1940

This species of tick occurs many large and medium-sized mammals of domesticated and wild-grassed animals, eating meat, such as rodents, hedgehogs and rabbits, causing some diseases and weight loss. [50] reported this parasite in the cats of Babylon, Baghdad, Basrah, Al-Diwaniya, Kerbala, Missan, Al-Muthana, Al-Najaf, Thi Qar and Wasit.

References

[1]. Al-Saeed, W. M. Studies on parasites of public health importance from cats in Mosul. M. Sc. Thesis, Coll. Med., Univ. Mosul: 110 (1983).

[2]. Salman, Y. J. Survey parasitic worms in the gut of cats cities Baghdad and Kirkuk with the study of biological worm Toxocara cati (Schrank, 1788). M. Sc. Thesis, Coll. Sci., Univ. Baghdad: 100 pp. (In Arabic) (1987).

[3]. Daoud, I. S.; Al-Tae, A. R. A. & Salman, Y. J. Prevalence of gastro-intestinal helminthes in cats from Iraq. J. Biol. Sci. Res., 19(2): 363-368. (1988).

[4]. Al-Sudani, N. M. L. Preliminary study of the migration of histological and pathogenicity of larvae cats ascaris Toxocara cati and Toxascaris leonine white mice in Balk / c. M. Sc. Thesis, Coll. Educ. (Ibn Al-Haitham), Univ. Baghdad: 62 pp. (In Arabic)(1993).

[5]. Al-Mamori, A. L. Study bio, chemical and immunological in cats ascaris Toxocara cati and Toxascaris leonine. M. Sc. Thesis, Coll. Educ. (Ibn Al-Haitham), Univ. Baghdad: 71 pp. (In Arabic) (1994).

[6]. Al-Rubaie, A. L. S. Epidemiology of the alimentary canal helminth parasites of cats from Baghdad city and effect of some plant extracts on larvae and adults of cat ascarid Toxocara cati. Ph. D. Thesis, Coll. Educ. (Ibn Al-Haitham), Univ. Baghdad: 108 pp (In Arabic (1998).

[7]. Kallo, O. J. Detection of ecto- and endoparasites in house cats in Baghdad Province. Iraqi J. Vet. Sci., 18(1): 27-30(2004).

[8]. Abdullaha, Some helminthes parasitized on stray cats Felis catus L. in Basrah and Epizootiological and biological studies on Taenia taeniaeformis Batsch, 1786. Ph. D. Thesis, Coll. Educ., Univ. Basrah: 174 pp. (In Arabic) (2007).

[9]. Al-Rammahi, H. M.; Kareem, S. M. & Hammadi, A. K. Prevalence of intestinal helminthes in feral cats in Babylon province/ Iraq, urban and rural locations. Mir. Res. Vet. Sci. Anim., 3(2): 44-52(2014).

[10]. Al-Rubaie, A. L.; Mhaisen, F. T. & Al-Tae, A. A. Survey of some gastrointestinal cestodes and nematodes from stray cats at Baghdad city, Iraq. Amer. J. Biol. Lif. Sci., 3(6): 246-253 (2015).

11. Naser, F. H. Epidemiological and diagnostic study of external and Internal Parasites in Domestic Cats (Felis catus) in Al-Qadisiyah Province. M. Sc. Thesis, Coll. Sci., Univ. Al-Qadisiya: 122 pp. (In Arabic(2016).

[12]. Zangana, A. J. M. Histopathological effects resulting from infection stray cats by intestinal parasites in Saladin province. Tikrit J. Pur. Sci., 21(3): 7-11(2016).

[13]. Al-Khalidi, N. M.; Al-Alousi, T. I. & Subber, A. H. Internal and external parasites in cats in Mosul, Iraq. J. Vet. Parasitol., 2(2): 137-138 (1988).

[14]. Al-Saeed, W. M.; Hssain, S. K. & Mahmoud, N. E. Toxoplasma gondii: An experimental approach for isolation from stool of cats. Proc. Fir. Sci. Con. Fou. Tec. Ins., Sep. 21-22: 533-544 (1988).
[15]. Nihad, W.; Al-Khalidi, T. I. & Al-Alousi, S. A. H. Internal and external parasites in cats in Mosul, Iraq. Vet. Parasitol., 2: 137-138(1988).
[16]. Al-Saidya, A. M. & Al-Kennany, E. R. Pathological and histochemical study on cats and mice experimentally with Toxoplasma gondii. Iraqi J. Vet. Sci., 20(2): 249-263(2006).
[17]. Dawood, K. A.; Abdulrazaq, A. M. & Naama, A. J. Detection of Toxoplasmosis in human and cats immunologically. Kufa J. Vet. Med. Sci., 1(1): 65-71 (2010).
[18]. Switzer, A. D.; McMillan-Cole, A. C.; Kasten, R. W.; Stuckey, M. J.; Kass, P. H. & Chomel, B. B. Bartonella and Toxoplama in stray cats from Iraq. American J. Trop. Med. Hyg., 89(6): 1219-1224(2013).
[19]. Saida, L. A. & Nooraldeen, K. N. Prevalence of parasitic stages in six leafy vegetables in markets of Erbil city, Kurdistan region-Iraq. Zanco J. Pur. App. Sci., 26(2): 25-30. (2014).
[20]. Yamaguti, S. Systema helminthum, vol. II: The cestodes of vertebrates. Intersci. Publ. Inc. Ltd., New York: 869(1959).
[21]. Yamaguti, S. Systema helminthum, vol. III: The nematodes of vertebrates, part I. Intersci. Publ. Inc. Ltd., New York: 679 (1961).
[22]. Soulsby, E. J. L. Helminths, arthropods and protozoa of domesticated animals, 6th ed. Mönnig's veterinary helminthology and entomology, Bailliere, Tindall and Cassell, London: 824(1968).
[23]. EOL, Encyclopedia of Life on-line database, http//www.eol.org. (Accessed April 2017).
[24]. PESI ,Pan-European Species directories Infrastructure. http://www.eu nomen.eu/portal/taxon.php. (Accessed April 2017).
[25]. WFE. Wikipedia the Free Encyclopedia. https://en.wikipedia.org/wiki. (Accessed April 2017).
[26]. Al-Aredhi, H. S. Prevalence of gastrointestinal parasites in domestic cats (Felis catus) in Al-Diwaniya province/ Iraq. Int. J. Cur. Mic. App. Sci., 4(5): 166-171(2015).
[27]. Machattie, C.; Mile, E. A. & Chadwich, C. R. Naturally occurring oriental sore of the domestic cat in Iraq. Trans. Roy. Soc. Trop. Med. Hyg. 25:103-106(1931).
[28]. Hadi, A. M. & Faraj, A. A. Role of domestic cats Felis catus as reservoir hosts of internal parasites and protozoa in Baghdad. Bull. Iraq Nat. Hist. Mus., 13(1): 89-94(2014).
[29]. Al-Khushali, M. N. Prevalence of zoonotic parasites stray cats Baghdad. Iraqi Pos. Med. J., 6(2): 152-156(2007).
[30]. Hadi, E. D.; Suleiman, E. G.; Al-Obadi, Q. T. & Arslan, S. H. Diagnostic study of Cryptosporidium spp. And Giardia spp. in stray dogs and cats in Mosul city, Iraq. Iraqi J. Vet. Sci., 28(1): 19-24. (In Arabic) (2014).
[31]. Dhamraa, R. J. & Mohammed, J. A. Seropathological diagnosis of Toxoplasma gondii in stray cats in Baghdad Province. J. Ver. Med. Sci., 38(1): 92–98(2014).
[32]. Suliman, E. G. Detection the infection with Babesia spp., Cytauxzoon felis and Haemobaronella felis in stray cats in Mosul. Iraqi J. Ver. Sci., 23(1): 49-55(2009).
33. Mirza, M. Y. Incidence and distribution of coccidian (Sporozoa: Eimeriidae) in mammals from Baghdad area. M. Sc, Thesis,Coll.Sci., Univ. Baghdad:165(1970).
[34]. Jalil, D. R & Alwan, M. J. Seropathological diagnosis of Toxoplasma gondii in stray cats in Baghdad province. Iraqi J. Vet. Med., 38(1): 92 – 98. (2014).

[35]. Al-Khalidy, K. O. H.; Alekealy, K. A. D. & Almialy, H. M. Histopathological study of some internal organs in cats infected with Toxoplasma gondii. Al-Qadisiyah J. Ver. Med. Sci., 13(2): 11-15. (In Arabic (2014).
[36]. Obaid, H. M. Serological and microscopical detection of Toxoplasma gondii in Kirkuk city- Iraq. Diyala J. Pur. Sci., 10(4): 46-55. (2014).
[37]. Al-Dabagh, M. A.; Babero, B. B. El-Hashimi, M. The zoonosis of animal parasites in Iraq. IV: Some unusual lesions associated with an Opisthorchis tenuicollis infection. Vet. Rec., 76(4): 116-119(1964).
[38]. Al-Obaidi, Q. T. Prevalence of internal helminthes in stray cats (Felis catus) in Mosul, Iraq. J. Anim. Vet. Adv., 11(15): 2732-2736(2012).
[39]. Al- Barwari, N. First record of ten species of helminth parasites from vertebrates in Iraq. Iraqi J. Sci., 24: 101-108(1983).
40. Al-Waeli, A. A. A. The effect of some green algae extracts Chara vulgaris L. on the eggs and the cysticercus of Taenia taeniaeformis Batsch, 1786. M. Sc. Thesis, Coll. Educ. Pure, Univ. Basrah: 111 pp (In Arabic.(2015).
[41]. Babero, B. B. & Al-Dabagh, M. A. The zoonosis of animal parasites in Iraq. XII: The dog as a reservoir for human cestode infections. J. Fac. Med., Baghdad, (New Series), 5(4): 149-158(1963).
[42]. Al-Jumaili, S. K. A. Study of the affection of vaccination with different antigens from worms Toxocara cati and Toxascaris leonine. M. Sc. Thesis, Coll. Educ. (Ibn Al-Haitham), Univ. Baghdad: 90 pp. (In Arabic) (1990).
[43]. Al-Kubaisi, A. B. H. Study of resistance infected white mice Balk / c worms cats ascaris Toxocara cati and Toxasceris leonine. M. Sc. Thesis, Coll. Educ. (Ibn Al-Haitham), Univ. Baghdad: 98 pp. (In Arabic.(1992).
[44]. Al-Kubaisi, A. B. H. Effeciency immunized white mice (Balb / c) by somatic antigen of Toxocara canis and Toxasceris leonine sginest infection with T. cati and T. leonina worms. Al-anbar J. Agr. Sci., 3(1): 251-256. (In Arabic) (2005).
[45]. Hosin, A. B.. Efficiency immunization peritoneally with different antigens of Toxocara canis, Toxascaris leonine aganist infection with Toxocara cati and Toxascaris leonine larvae. Iraqi J. Vet. Sci., 22(2): 111-118. (In Arabic) (2008).
[46]. Al-Azzawi, S. S. M. Biological studies on the parasite cats ascaris Toxocara cati. M. Sc. Thesis, Coll. Educ. (Ibn Al-Haitham), Univ. Baghdad: 100 pp. (In Arabic) (1989).
[47]. Hosin, A. B. Using of bifferent antigens of dog Ascaris Toxascaris leonine and Toxocara canis subcutaneously to resist cat Ascsris Toxascaris leonine and Toxocara canis. Al-Anbar J. Vet. Sci., 2(1): 32-43. (In Arabic) (2009).
[48]. Muhaimeed, A. A. Prevalence of Toxocara cati and Toxocara canis in AL- Alaam Tikrit city Salahuddin. Tikrit J. Pur. Sci., 13 (1): 51-56(2008).
[49]. Woodruff, A. W.; Salih, S.Y.; De Savigny, D.; Baya, E. I.; Shah, A. I. & Dafalla, A. A. Toxocariasis in Sudan, Ann. Trop. Med. Parasitol., 75(5): 559-561(1981).
[50]. Shubber, H. W.; Al-Hassani, N. A. & Mohammad, M. K. Ixodid ticks diversity in the middle and south of Iraq. Int. J. Rec. Sci. Res., 5(9): 1518-1523(2014).