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Helminth parasites of House Shrew *Suncus murinus* (L., 1766) in Nassiriyah City, Thi-qar Province

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Abstract

Forty specimens of house shrew *Suncus murinus* were collected from several localities in center of Nassiriyah city, Thi-qar Province for the period from February to July 2008. The animals were examined for helminth parasites. 23(57.5 %) to be infected with three species of helminths, two cestodes *Staphylocystis furcata*, *S. multihamata* and one nematode *Pseudophysaloptera petaloidi*. The measurements of the isolated parasites were taken and compared with previous studies carried out in the world. All these helminths were recorded in the present study for the first time in Iraq.

Introduction

Few studies were carried out in Iraq concerned helminths of insectivores. Only one available study was done for identification of helminths in house shrew *Suncus murinus* in Basrah province (Al-Zihiry, 2002). The aim of the present study is to investigate the helminth fauna of house shrew that advancement the helminth fauna of southern Iraq.

Materials and Methods

A total of 40 house shrew *Suncus murinus* L., (1766) (Mammalia: Insectivores) were trapped from five areas in center of Nassiriyah city, Thi-qar Province (Southern Iraq) from February to July 2008 using some metal traps. The animals were killed with ether, autopsied in Parasitology laboratory, College of Medicine, University of Thi-qar as soon as they collected. The intestinal tracts were removed, examined under dissecting microscope for helminth parasites. Cestodes were washed with normal saline for several times, kept around 24 hours in refrigerator for relaxing, then fixed

in A.F.A (Alcohol-Formalin-Acetic acid), preserved in 70% ethylalcohol and stain with acetocarmine.
The collected nematodes were killed in hot water (70 C°), then transfer to 70% ethylalcohol plus 5% pure glycerin for fixation and preservation. Temporary preparation was made using lactophenol for clearing the internal structures that useful for taxonomic study. Measurements of all helminth organs were taken with aid of the ocular micrometer, draws were made with aid of a camera lucida. Yamaguti, (1959) (1961), Vaucher (1971), Schmidt (1986) Sawada and Ohono (1993) and Noor-Un-Nisa (2001) were depended to classify the helminth parasites that collected in the present study.

Results

(All measurements in millimeters)

Staphylocystis (Staphylocystis) furcata (Stieda, 1862) Spassky, 1950

Description (Figure 1): small-sized cestodes, mature worm 7.3-9.6 length by 0.5-0.72 width. Proglottids wider than long. Scolex 0.168-0.192 long by 0.264-0.302 wide. Sucker rounded 0.096-0.115 in diameter. Rostellum mushroom-like shaped, 0.048-0.062 in diameter, armed with single row of 27-30 spanner shaped hooks, 0.021-0.026 long. Genital pores unilateral, located in the anterior part of proglottid margin. Cirrus sac 0.11-0.13 long by 0.048-0.052 wide. Internal seminal vesicle 0.067-0.072 long by 0.019-0.028 wide. External seminal vesicle 0.073-0.076 long by 0.031-0.038 wide. Testes three in number, 0.086-0.1 long by 0.05-0.057 wide, one poral and two aporal. Ovary bilobate, 0.091-0.014 long by 0.038-0.048 wide. Vitelline gland compact, 0.048-0.057 long by 0.024-0.033 wide, located posterior to ovary. Eggs oval-shaped, 0.052-0.055 long by 0.033-0.035 wide. Onchosphere spherical 0.02-0.026, in diameter, embryonic hooks 0.11 long.

Staphylocystis (Staphylocystis) multihamata Sawada et Ohono, 1993

Description (Figure 2): Small-sized cestode, whole worm 4.2-6.4 length by 0.3-0.52 width (at mature proglottids). All proglottids wider than long. Scolex 0.184-0.218 long by 0.16-0.23 wide and has four ovoid suckers, 0.094-0.115 long by 0.083-0.103 wide. Rostellum, 0.069-0.075 long by 0.08-0.085 wide, armed with single row of 58-66 hooks, 0.013-0.014 long. Rostellar sac, 0.092-0.103 long by 0.082-0.11 wide. Genital pores unilateral, located at the middle of segment. Testes three, 0.044-0.048 long by 0.064-0.072 wide, one poral and two aporal. Cirrus sac, 0.1-0.12 long by 0.04-0.046 wide. Internal seminal vesicle located in cirrus sac, 0.06-0.07 long by 0.028-

0.036 wide. External seminal vesicle, 0.05-0.056 long by 0.032-0.04 wide. Ovary transversely elongate, bilobed, 0.112-0.128 in transverse axis. Vitelline gland compact, lobated, 0.048-0.052 long by 0.024-0.032 wide, located posterior to ovary. Gravid segments undeveloped.

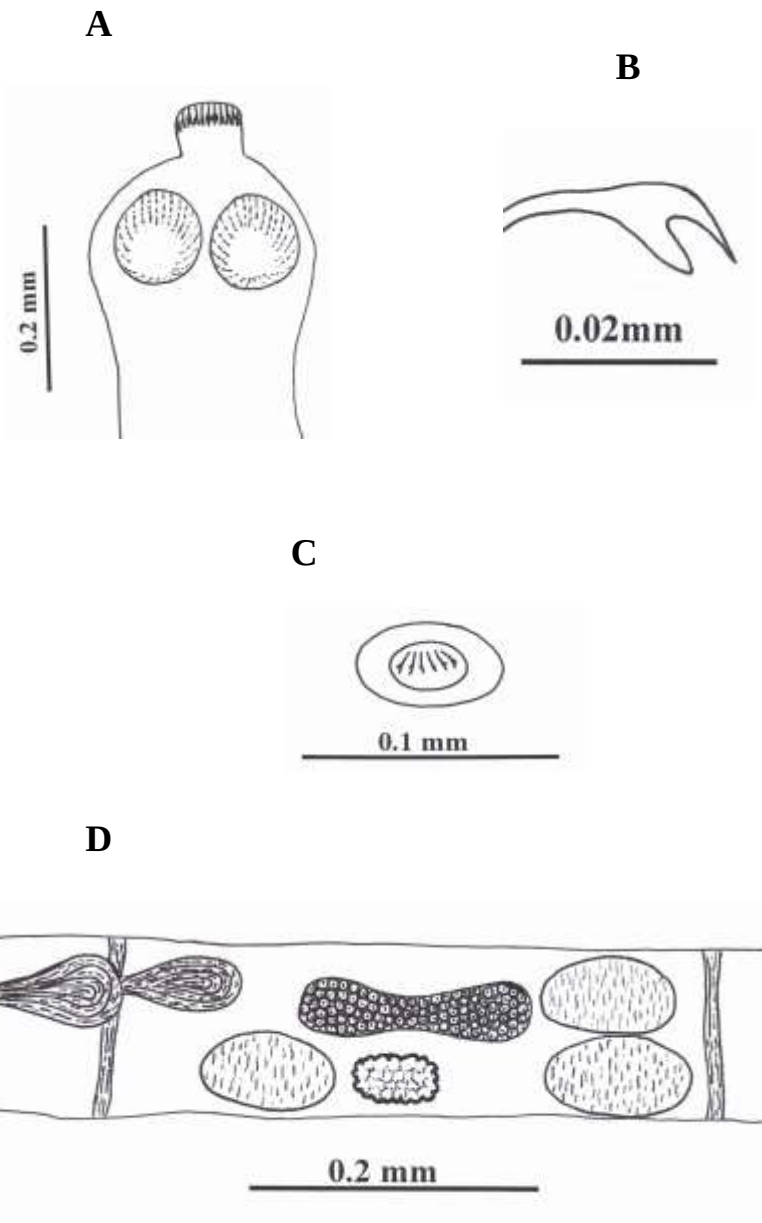


Fig. (1): *Staphylocystis furcata*. A: Scolex B: Rostellar hook C: Egg D: Mature proglottid

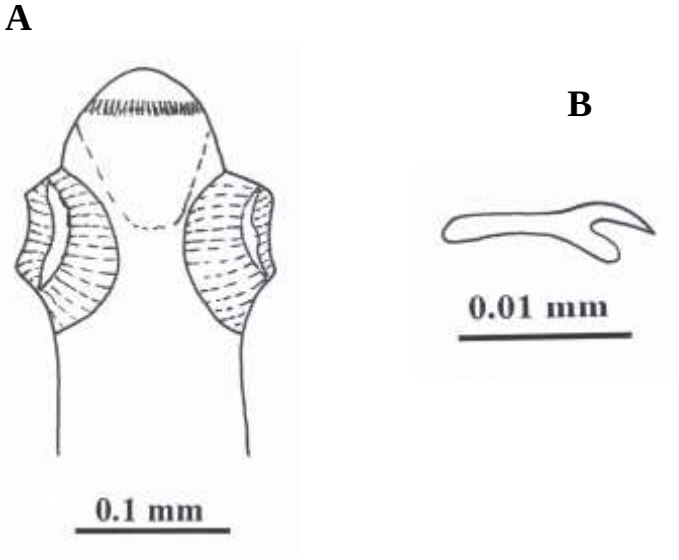


Fig. (2): *Staphylocystis multihamata*. A: Scolex B: Rostellar hook C: Mature proglottid

Pseudophysaloptera petaloidi Rehana, 1981

Twenty specimens of this parasite were isolated from the stomach of house shrew *Suncus murinus*. All collected specimens were found the male in copula with female, and some of them were found penetrated the stomach wall.

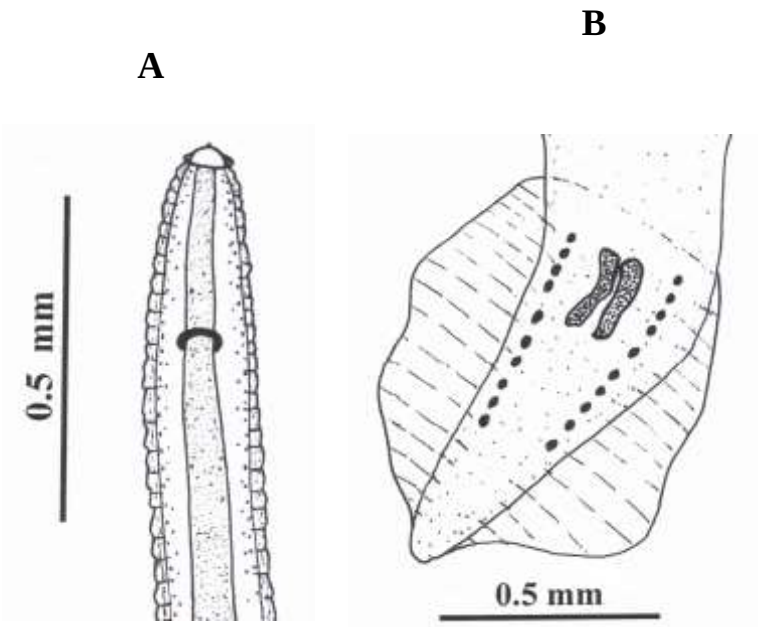
Description (Figure 3). Cuticle thick inflated and reflected over the lips where cephalic collarette was found. The two lateral lips bear three teeth. Buccal cavity absent.

Male

Body 5.8-10.73 long by 0.37-0.41in greatest width. Cephalic collerate 0.075-0.087 in diameter. Two lips were present 0.034-0.039 high, 0.044-0.056 width, each one provided with three pointed teeth. Nerve ring at the distance of 0.225-0.254 from the anterior end. Esophagus long and have two portions, muscular portion 0.16-0.2 long by 0.054-0.059 wide, and glandular one 1.44-1.58 long by 0.072-0.098 wide. Caudal alae thick 0.72-0.784 long by 0.4-0.51 wide, provided with 10 pairs of caudal papillae, 4 pairs are pre-cloacal, 1 pair is cloacal and 5 pairs are post-cloacal. Spicules two, equal in size, 0.17-0.19 long by 0.033-0.045 wide. Tail 0.64-0.72 long.

Female

Female longer than male, 10.5-23.2 long by 0.357-0.378 wide. The cuticle is inflated over the lips. Cephalic collarate is present, lateral lips are present, 0.035-0.036 high, 0.036-0.038 wide. A muscular portion of esophagus measuring 0.23-029 long by 0.063-0.07 wide, while the glandular portion measuring 1.63-1.92 long by 0.081-0.098 wide. Nerve ring at the distance of 0.025-0.029 from the anterior end. Vulva at 5.21-7.78 from anterior end of the body. Tail 0.28-0.323 long. Uterus filled with eggs measure 0.044-0.048 by 0.024-0.028


A
B
0.5 mm
0.5 mm

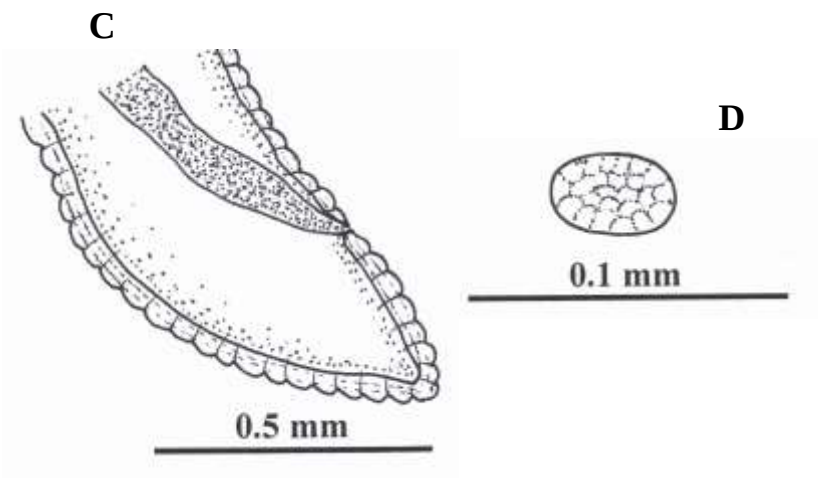

C
D
0.5 mm
0.1 mm

Fig. (3): *Pseudophysaloptera petaloidi*. A: Anterior portion B: Posterior end of male C: Posterior end of female D: Egg

Discussion

Staphylocystis furcata

Synonyms: *Hymenolepis uncinata* (Stieda, 1862) Bear, 1932; *Hymenolepis furcata* (Stieda, 1862) Bear, 1925; Meggitt, 1927; Johri, 1934; Zarnowski, 1955.

Staphylocystis furcata was recorded in the present study for the first time in Iraq while it was recorded in several studies in the world. Baylis (1928) recorded the cestode *Hymenolepis uncinata* as a synonym for *S. furcata* from *Sorex araneus* in Oxford, England. It was also isolated from *Crocidura murina* in Lucknow by Johri (1934). Zarnowski (1955) identified this cestode from *Sorex* sp., *Crocidura* sp. in Poland, while it was collected from *Sorex araneus* and *Sorex minutus* in Swiss (Vaucher, 1971). From small intestine of *Suncus murinus, S. furcata* was isolated in Java Island, Indonesia (Sawada and Oda, 1993) and in East Kalimantan, Indonesia (Sawada and Yasuma, 1994), also it was isolated by Roots *et al*., 1994 through the survey done on 109 common shrews *S. araneus* and 72 pygmy shrews *S. minutus* in Southeast England, whereas detected by Kirillova and Kirillov (2007) from common shrew *S. araneus* in Samara region, Russia.

Several species of Coleoptera insects: *Geotrupes stercorosus*, *Pterostichus vulgaris*, *Tribolium castaneum*, *Necrophorus humator*, *Oeceoptoma thoracica*, *Thanatophilus sinuatus* and *Silpha obscura* serve as an intermediate hosts for *S. furcata* (Kisielewska, 1959; Rybicka, 1959; Joyeux *et al*.,1963 and Kisielewska and Prokopic, 1963) whereas Cysticercoids of *S. furcata* (Stieda, 1962), were found in the thoracic and abdominal cavities of Orthopterous insects (Orthoptera, Acridioidea) belonging to five species: *Chorthippus apricarius*, *Chorthippus paralellus*, *Omocestus viridulu*, *Chrysochraon brachypterus* and *Chrysochraon dispar*. In these studies, the cysticercoids were described and their incidence in both sexes of the examined intermediate hosts was compared.

Table (1): Comparison of measurements (mm) of *S. furcata* in present study and other studies.

Measurements	Vaucher, 1971 *Sorex* sp.	Sawada and Oda, 1993 *Suncus murinus*	Sawada and Yasuma, 1994 *S. murinus*	Present study *S. murinus*
Body				
Long	54	8.2-9.6	6.2-7.6	7.3-9.6
Wide	1.3	0.5-0.6	0.6-0.7	0.5-0.72
Scolex				
Long	0.17-0.27	0.17-0.18	0.16-0.17	0.16-0.19
Wide	In diameter	0.24-0.32	0.29-0.30	0.26-0.3
Sucker				
Long	----------	0.08-0.09	0.07-0.08	0.09-0.11
Wide		diameter	diameter	diameter
Rostellum	0.064-0.1	0.04-0.06	0.04-0.05	0.04-0.06
Long	0.05-0.073	0.08-0.1	0.07-0.08	
Wide				
Rostellar hooks	23-30	26-30	27-30	27-30
Number	0.023-0.027	0.021-0.025	0.021	0.021-0.026
Long				
Cirrus Sac	0.09-0.13	0.14-0.15	0.08-0.09	0.11-0.13
Long	0.02-0.03	0.03-0.04	0.01-0.02	0.04-0.05
Wide				
Testis				
Long	----------	0.1-0.12	0.04-0.05	0.08-0.1
Wide		0.063	0.021-0.028	0.05-0.057
Ovary				
Long	0.059-0.111	0.13-0.15	0.08-0.09	0.09-0.14
Wide		transverse axis	transverse axis	transverse axis
Vitteline gland	----------	0.04-0.05	0.035	0.04-0.05

Long Wide		0.08	0.021	0.02-0.03

Staphylocystis multihamata

Staphylocystis multihamata was reported as a new species by Sawada and Ohono (1993) from house shrew *Suncus murinus* during the study carried out in Delhi, India, in this study the similarity between the present helminth and the closely resemble three others: *S. toyamaensis*, *S. naganoensis* and *S. trisuliensis* were discussed. All four species are similar in measurement of rostellar hooks ranging in length from 0.010 to 0.018 millimeters and similar in their shape. However, *S. multihamata* differs from them in having a greater number of rostellar hooks (60-67 against 14-22). In the same year, this cestode was isolated during the examination of the intestinal tracts of 31 specimens of house shrew *S. murinus* captured at four sites of Java Island, Indonesia (Sawada and Oda, 1993). This cestode was also reported in study of Sawada and Yasuma (1994) on two specimens of *S. murinus* in Samarinda city, Indonesia. *Staphylocystis multihamata* was reported in the present study for the first time in Iraq and the measurements are similar to those of the original description.

Table (2): Comparison of measurements (mm) of *S. multihamata* in the present study and other studies.

Measurements	**Sawada and Ohono, 1993 *S. murinus***	**Sawada and Oda, 1993 *S. murinus***	**Sawada and Yasuma, 1994 *S. murinus***	**Present study *S. murinus***
Body				
Long Wide	4.8-5.6 0.3-0.4	8.2-9.4 0.8-1.1	7.2-8.7 0.7-1.2	4.2-6.4 0.3-0.52
Scolex				
Long Wide	0.280-0.385 0.350-0.392	0.17-0.23 0.29-0.32	0.18-0.210 0.28-0.301	0.18-0.218 0.16-0.23
Sucker				
Long Wide	0.119-0.126 0.098-0.105	0.098-0.112 0.105-0.119	0.105-0.119 diameter	0.09-0.11 0.08-0.10

Rostellum				
Long	0.063-0.07	0.07	0.06-0.07	0.06-0.07
Wide	0.084-0.10	0.07-0.09	0.08-0.09	0.08-0.085
Rostellar hooks	60-67	56-62	55-67	58-66
Number	0.014	0.014	0.014	0.01-0.01
Long				
Cirrus Sac				
Long	0.11-0.14	0.12-0.14	0.11-0.13	0.1-0.12
Wide	0.028-0.035	0.03-0.04	0.03-0.04	0.04-0.04
Testis				
Long	0.07-0.07	0.04-0.06	0.04-0.07	0.04-0.04
Wide	0.04-0.05	0.07-0.09	0.07-0.08	0.06-0.07
Ovary				
Long	0.105-0.147	0.09-0.119	0.08-0.11	0.11-0.12
Wide	transverse axis	transverse axis	transverse axis	transverse axis
Vitelline gland				
Long	0.056	0.07	0.06-0.07	0.04-0.05
Wide	0.021-0.028	0.04-0.04	0.04-0.05	0.024-0.03
Egg				
Long	----------	0.053	0.04-0.05	----------
Wide		0.039	0.03-0.03	

Pseudophysaloptera petaloidi

Individuals of the genus *Pseudophysaloptera* known as parasites of the stomach and the upper part of the small intestine of Rodents and Insectivores distributed worldwide (Yamaguti, 1961). Baylis, 1934, erected this genus depending on genital characters of the male; these characters regarded the basis of differences between *Pseudophysaloptera* and *Physaloptera*. The main difference is the pattern of caudal papillae which are sessile in the *Pseudophysaloptera* pedunculated in part of genus *physaloptera* (Noor-Un-Nisa, 2001).

Several species of this genus were recorded from the various small mammalian hosts; *P. sorcina* was recorded in Poland from Blackbird *Turdus merula* by Okulewicz, 1979. *P. kahamanii* was isolated from the stomach of dormouse *Eliomys quercinus* in Formenta, Spain, regarded -at that time- the first and only species of *Pseudophysaloptera* parasitizing rodents in the nature (Mas-Coma and Gallego, 1977). *P. enigmatica* was reported as a new species by Bennett (2003) from the stomach of *Dactylopsila trivirgata* in Queensland, Australia. A review of the genus was given in that study.

Kinsella (2007), isolated the nematode *P. formosana* from vagrant shrew *Sorex vargans* during the survey done in western Montana, USA.

Pseudophysaloptera petaloidi was first discovered by Rehana in 1981 from the stomach of *S. murinus* in Karachi, Pakistan. In the same country, this nematode was redescribed by Noor-Un-Nisa, 2001 from stomach and upper part of small intestine of house shrew *S. murinus*. In the present study, *P. petaloidi* was recorded for the first time in Iraq and its measurements were similar to those reported in two previous studies. The similarity between them may be attributed to that the all specimens were isolated from the same natural host.

Pseudophysaloptera petaloidi differs from other species in having 10 pairs of sessile, prominent and large caudal papillae, and also having peculiar petal-shaped, fairly larger, but less chitinized spicules (Noor-Un-Nisa, 2001).

Table (3): Comparison of measurements (mm) of *Pseudophysaloptera petaloidi* in present study and study of Noor-Un-Nisa (2001).

Measurements	Noor-Un-Nisa (2001) *Suncus murinus*		Present study *S. murinus*	
	Male	Female	Male	Female
Total length	5.16-11.39	12.07-45.12	5.8-10.73	10.5-23.2
Maximum width	0.36 (tail region)	0.36 (vulva region)	0.37-0.41	0.35-0.37
Distance the nerve ring from the anterior end	0.20-0.23	----------	0.225-0.254	0.25-0.29
Esophagus (Muscular portion) Long Wide	0.13-0.17 0.05-0.054	0.22-0.23 0.06	0.16-0.2 0.054-0.059	0.23-0.29 0.063-0.07
Esophagus (Glandular portion) Long Wide	1.45-1.62 0.08-0.085	1.56-1.82 0.062-0.06	1.44-1.58 0.072-0.09	1.63-1.92 0.08-0.09
Caudal alae Long Wide	0.68-0.72 0.52-0.54	----------	0.72-0.784 0.4-0.51	----------

Number of caudal papillae	10 pairs	----------	10 pairs	----------
Length of tail	0.29-0.31	0.23-0.24		0.28-0.323
Eggs **Long** **Wide**	---------- --	 0.045-0.05 0.024-0.026	----------	 0.044-0.048 0.024-0.028

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الديدان المتطفلة في الزبابة المنزلية *Suncus murinus* (L., 1766) في مركز مدينة الناصرية محافظة ذي قار

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الخلاصة

جمعت في الدراسة الحالية 40 عينة من الزبابة المنزلية *Suncus murinus* من مناطق عدة في مركز مدينة الناصرية,محافظة ذي قار للمدة بين شهر شباط شهر تموز لعام 2008 . تم فحص هذه الحيوانات بحثا عن الديدان المتطفلة فيها. كانت 23(57.5 %) من العينات المفحوصة مصابة بثلاثة أنواع من الديدان, اثنان من الشريطيات *Staphylocystis furcata* ,*Staphylocystis multihamata* وواحدة من الخيطيات *Pseudophysaloptera petaloidi*. أعطي وصفا كاملا للطفيليات المعزولة وقورنت قياساتها مع أخرى مسجلة في دراسات سابقة أجريت في مناطق مختلفة من العالم. جميع الأجناس والأنواع المعزولة في الدراسة الحالية تسجل لأول مرة في العراق.