Bull. Iraq nat. Hist. Mus.
(2017) 14 (4): 307-313
http://dx.doi.org/10.26842/binhm.7.2017.14.4.0307

NEW RECORD OF PROTOZOAN *NYCTOTHERUS HARDWICKII* (JANAKIDEVI, 1961) FROM ROUGH-TAILED GECKO *CYRTOPODION SCABRUM* IN BAGHDAD, IRAQ

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Received Date: 12 November 2017 **Accepted Date: 0٣ December 2017**

ABSTRACT

The ciliate species isolated from midgut and hindgut of Rough-tailed gecko *Cyrtopodion scabrum* (Heyden, 1827), identified as *Nyctotherus hardwickii* was collected from many regions of Baghdad, Iraq. The current study deals with a description and comparison of the morphology and morphometric characters of this species for the first time in Iraq.

Key words: Ciliates, Morphmetric, Morphology, *Nyctotherus hardwickii*, Protozoan.

INTRODUCTION

Rough-tailed gecko is a species of gecko *Cyrtopodion scabrum* (Heyden, 1827), its synonyms are :*Gymnodactylus scaber*, *Cyrtodactylus scaber* and *Stenodactylus scaber* (Roughscaled Gecko) that distributed in Turky, Iraq, Iran, Qatar, Jordan, Afghanistan, Saudi Arabia, Oman, United Arab Emirates, Sudan, Ethiopia, Eritrea, India, Pakistan, Egypt, Kuwait, USA (introduced to Texas) (Rosler, 2000) .

In Iraq Mahdi and Georg (1969) recorded this rough- tailed gecko in many regions, but there are few studies about their protozoan and other parasites infected by them.

Recordings of *Nyctotherus* sp. are few in the world at large and in Iraq in particular; that Satbige *et al*. (2017) recorded from two pet turtle were presented with a history of diarrhea, dehydration, weight loss and passage of undigested food in the faeces. Ze`phyrin *et al*. (2013) described two species of Nyctotheridae in *Bufo regularis* (Amphibia: Anura) from the Northwest of Cameroon.

Rataj *et al*. (2011) recoded *Nyctotherus* sp. in Spiny-tailed lizards *Uromastyx hardwickii* and *Uromastyx dispar*.

In Iraq, Al-Mayali *et al*. (2010) recorded *N. ovalis* in cockroach *Periplaneta americana* (L.) in Al-Diwaniya province.

The current study describes the ciliate species of *N. hardwickii* isolated from the gut of Rough-tailed gecko *Cyrtopodion scabrum* for the first time in Baghdad capital of Iraq.

MATERIALS AND METHODS

The Rough-tailed gecko (*Cyrtopodion scabrum*) were collected from different localities of Baghdad city in May to October 2016. All gecko were diagnosed in the Iraqi Natural History Museum and Researches Center where it is the place of this work. Hosts were dissected and removed their digestive systems were removed, midgut, hindgut were taken out separately and kept in different watch glasses containing saline (0.6% NaCl) in distilled water solution. The gut smears were first examined under a light microscope and then a permanent preparation was made. Fixation was done by Canada balsam after staining with Aceto carmine stain.

RESULTS AND DISCUSSION

During the present study 28 gecko were dissected only 16 were positive for the presence of *N. hardwickii* in their guts; the infection rate was 57.14%.

Classification

Kingdom: Protozoa
Phylum: Ciliophora
Class: Polyhymenophorea
Order: Heterotrichida
Family: Nyctotheridae
Genus: *Nyctotherus* Leidy, 1849
Species: *hardwickii* Janakidevi, 1961

Morphology

The body of the present ciliate is short elongate as short pearl- shape. It is wide at posterior and narrow at the anterior. The body is covered with the numerous cilia which are all the same length and same distribution but increase in the peristome (Tab. 1).

The boundary between the ectoplasm and the endoplasm is clear. Ectoplasm is more homogenous and transparent, while endoplasm is opaque due to multiple organelles. Macronucleus is cup-shape, lies in anterior part, often having very large spherules chromatin. Micronucleus is spherical dote, superimposed on the macronucleus on the right. Peristome started up at middle of the body; Cytopharynx is almost straight and uniform in diameter, it may reach to the posterior region with obtuse angle.

Many glycogen bodies were distributed in endoplasm, giant form of glycogen body in anterior region, hence brown to black brown (Pl.1).
There is a caudal projection in mid posterior end that eject and disappear during emotion containing cytopyge slit like which lead to contractile vacuole (Fig.1).

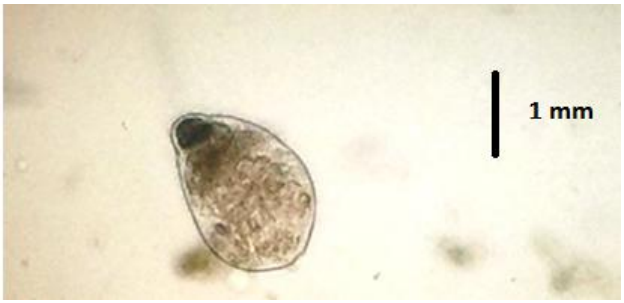

Plate (1):Light micrograph directly smear of *N. hardwickii* without stain, 400X.

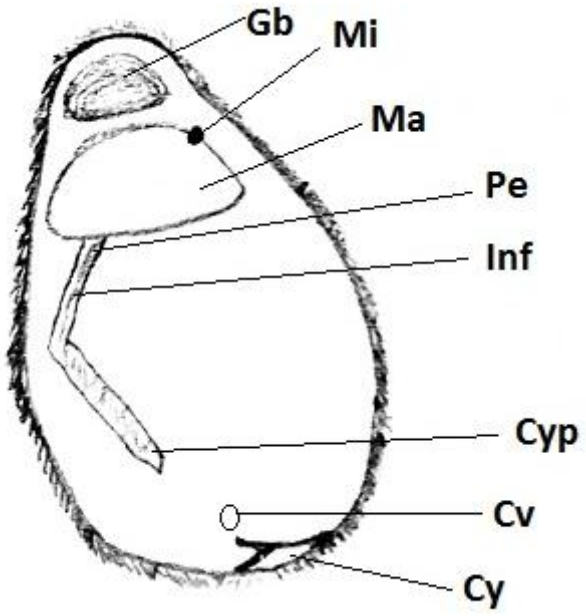

Figure (1): General morphology of *N. hardwickii*, drawing . *Abbreviations*: Cv-contractile vacuoles, Cy- cytopyge, Cyp-cytopharanx, Gb-glycogen body, Inf- infundibulum, Ma-macronucleus, Mi-micronucleus, Pe- peristome.

The movement the cilia is forward and then moves a rotational motion, decentralized and turns its body in different directions; this shows a difference in the shape and location of the macronucleus (Pl.2).

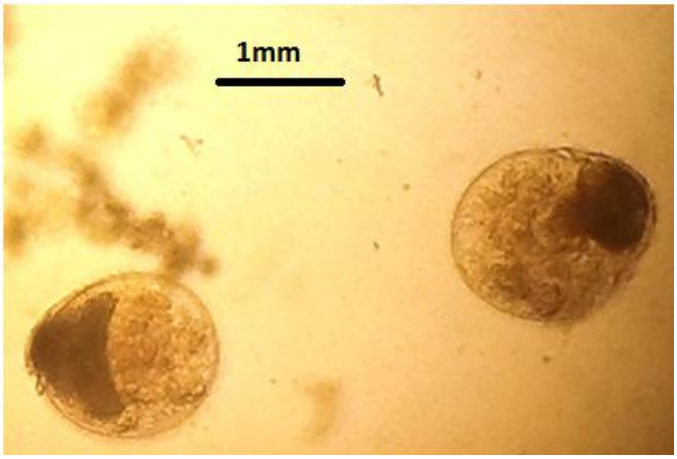

Plate (2): A difference in the shape and location of the macronucleus during the movement.

Type of the host: The Rough-tailed gecko, *Cyrtopodion scabrum*
Type of the locality: Adhamiya middle of Baghdad capital of Iraq.
Habitat: Mid and hindgut.
Type of the specimens: Permanent preparation belonging to this species are kept in the Department of Parasitology, Iraq Natural History Researches Center and Museum, University of Baghdad, Iraq.

Table (1): Comparison description of the species *N. hardwickii*

Comparative characters	*N. hardwickii* According to Janakidevi (1961)	*N. hardwickii* According Present author
Body shape	Pear-shaped with plastic pellicle	Short pearl shape
Dimensions	Length 110.0–190.0µ, average 153.4 µ; range of breadth 60.0–111.0 µ, average 86.0 µ	Length 3.9 - 3.7 mm and 3.1 - 3 mm width
Macronucleus	cup-shaped and suspended by two short karyophores.	Big cup-shape
Micronucleus	Superimposed on the macronucleus	Spherical dote, superimposed on the macronucleus
Peristome	-	Started up middle of the body
Cytopharynx	Long and almost reaching the posterior end of body and lined with membranelles on one side only	Almost straight and uniform in diameter, it may reach to the posterior region with obtuse angle
Contractile vacuole	Single, leading into a cytopygeal canal	Single, leading into a cytopygeal canal
Cytopyge	-	slit like which lead to contractile vacuole
Glycogen body	A densely granulated area in front of macronucleus	In anterior region, hence brown to black brown
Host	*Uromastix hardwickii*	*Cyrtopodion scabrum*
Locality	India**,** Maharashtra.	Baghdad, Iraq

Description:
The ciliate lives in the middle and posterior intestine of the Rough-tailed gecko, collected from many regions of Baghdad capital of Iraq. The cell is pearl-shape, with the anterior end narrower than the posterior end. It measures about 3.9 - 3.7 mm length, 3.1 - 3 mm width, macronucleus 2.2 - 2 mm length, 0.6 - 0.8 mm width, glycogen body 0.3 - 0.4 mm length, 0.4 - 0.5 mm width, peristome length about 1.8 – 2 mm with obtuse angle 130 º -125 º (Tab. 2)

Table (2): Morphometric characters of *N. hardwickii*.

	Cell length (mm)	Cell width (mm)	Mn. Length (mm)	Mn. Width (mm)	Gb. Length (mm)	Gb. Width (mm)	Pe. Length (mm)	AIP(º)
Max	3.9	3.1	2.5	0.6	0.3	0.3	1.8	130
Mean	3.8	3.05	2.35	0.7	0.35	0.4	2	127.5
Min	3.7	3	2.2	0.8	0.4	0.5	2.2	125
SD	0.1	0.5	0.15	0.1	0.5	0.2	0.2	2.5

Notes. AIP-angle infundibulum- peristome in degree, Gb-glycogen body, Max-maximum, Min-minimum, Mn- macronucleus, pe -peristome, SD- standard deviation.

The current study revealed a high rate of infection with intestinal protozoa in gecko 57.14% when compared with the previous studies. In Turkey, Nurkan *et al*. (2001) recorded 31.25% rate of infection with *N. hardwickii* in the spiny- lizard, *Laudakia stellio stellio*, by rectal contents. This difference may be due to the way of which the samples were obtained.

However, Rayyan *et al*. (2013) recorded 90% rate of infection with *N. hardwickii* of 67 the Roucktail Rock Agama, *Laudakia stellio* from Gaza Strip, Palestine. This difference is due to the difference of sample sizes.

There is no pre-study in Iraq about the gecko being infected with this ciliate protozoan. Therefore, there is no comparison in the rates of infection in Iraq. Accordingly, this study is considered the first record of the *N. harwickii* in Iraqi gecko.

ACKNOWLEDGEMENTS

The authors wish to thank Mr. Saman R. Afrasiab (Iraq Natural History Researches Center and Museum) for diagnosis the Geckos.

LITERATURE CITED

Al-Mayali, H. M., Muhammed, H. S. and Al-Yaqoobi, M.2010. Parasites of Cockroach *Periplaneta americana* (L.) in Al-Diwaniya province, Iraq. *Journal Thi-Qar Sciences*, 2 (3): 93-104.

Janakidevi, K. 1961. A new ciliate from the Spiny tailed lizard. Z. *Parasitenk*., 21 : 155-158. (Cited by : Mahabal, A. and Sharma, R.M. 2012. Fauna of Maharashtra, State Fauna Series, 20(Part-2). Published by the Director, Zoological Survey India, Kolkata, 673pp.

Mahdi, N. and Georg, P. V. 1969. A systematic list of the vertebrates of Iraq. University of Baghdad, *Iraq Natural History Museum, Publication*, No. 26: 1-104.

Nurkan, U., Bayram, G. and Semih, U. 2001. Protozoa Living in The Rectum of the Spiny-Lizard, *Laudakia stellio stellio* (Linnaeus, 1758) (Reptilia: Lacertilia) and their Structures. *Türkiye Parazitoloji Dergisi*, 25 (1): 79-83.

Rataj, V. L., Renata, L.K., Ksenija, V., Urška, M. and Alenka, D. 2011. Parasites in pet reptiles. *Acta Veterinaria Scandinavica*, 53(33):10-20.

Rayyan, A. , Al-Zain, B. and Al-Hindi, A. 2013. Gastrointestinal Parasites of the Rock tail Rock Agama, *Laudakia stellio* from Gaza Strip, Palestine. *Journal of Biology*, 1(2): 4- 39.

Rosler, H. 2000. Die postanale Beschuppung bei Cyrtodactylus Gray 1827 und Cyrtopodion Fitzinger 1843 - funktionelle und taxonomische Aspekte (Sauria: Gekkonidae). *Gekkota*, 2: 154-207.

Satbige, A. S., Kasaralikar, V. R., Halmandge, S. C. and Rajendran, C. 2017. *Nyctotherus* sp. infection in pet turtle: a case report. *Journal Parasitic Diseases*,41(2):590-592.

Zéphyrin, F., Paul, A.N., Pierre, N., Geneviève, B., Philippe, B. Bernard, V. and Télesphore, S. 2013. Description of two new species of Sicuophoridae and Nyctotheridae (Heterotrichina), endocommensal in the rectal ampulla of *Bufo regularis* (Amphibia: Anura) from the Northwest of Cameroon. *Protistology*, 8 (1): 16–21.

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تسجيل جديد للهدبي *Nyctotherus hardwickii* (Janakidevi, 1961) من الوزغ خشن الذيل *Cyrtopodion scabrum* في بغداد، العراق

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تاريخ الاستلام: ٢٠١٧/١١/١٢ تاريخ القبول: ٢٠١٧/١٢/٠٣

الخلاصة

عزل احد انواع الهدبيات من القناة الهضمية للوزغ خشن الذيل *Cyrtopodion scabrum*، و شخص على انه *Nyctotherus hardwickii* (Janakidevi, 1961) لنماذج جمعت من مناطق مختلفة من محافظة بغداد، العرق.

وصف هذا النوع مع اجراء مقارنة للشكل الخارجي له، كما تم اخذ القياسات لهذا النوع لأول مرة في العراق.