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Helminth Parasites of the Green Toad *Bufo viridis* Laurenti, 1768 in Baghdad Area, Central Iraq

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ABSTRACT

Examination of a small collection of the green toad from Baghdad area, central Iraq revealed presence of two cestodes *Proteocephalus* sp. and *Nematotaenia dispar* and four nematodes *Oswaldocruzia filiformis, Cosmocerca commutat, Cosmocercoides variabilis* and *Rhabdias bufonis*.

Keywords. *Bufo viridis ,Proteocephalus* sp., *Nematotaenia dispar, Oswaldocruzia filiformis, Cosmocerca commutata, Cosmocercoides variabilis, Rhabdias bufonis.*

INTRODUCTION

The green toad *Bufo viridis* Laurenti, 1768 is recorded in 52 countries according to IUCN-GAA, Biodiversity Assessment Unit, Center for applied Science), it appeared in the red list of as LC (Least Cocern) (IUCN, 2006) and distributed in much of Europe, Russia, Mongolia, Mediterranean countries, and southwest Asia in Iran, Iraq, Jordan, Lebanon, Palestine, Saudi Arabia, Syria, and Turkey (Stock *et al*., 2001). In Iraq, it is one of the most common amphibians among eight species that constitute the Iraqi amphibian fauna (Mahdi and George, 1969). It is widely distributed in the north and middle (Khalaf, 1959) inhabiting open areas often somewhat faraway from water bodies, especially in the wetlands, orchards, gardens, cases and shores of irrigation ditches and lakes.

Although little is known about the amphibian parasites in the Middle East (Al-Sorkhy and Amr, 2003) ; some studies on the subject are available in the adjacent countries including Mashaii (1999, 2005) and Mashaii *et al*.(2000) from Iran, Madi (1976) and Al-Sorkhy and Amr (2003) from Jordan, Oguz *et al*.(1994), Yildirimhan (1999a,b), Yildirimhan *et al*. (1996, 1997a,b, , 2001a,b, 2005a,b, 2006a,b), Dusen and Oz (2004), Dusen (2007) and Yildirimhan and Karadeniz (2007) from Turkey. In Iraq , rather few works were carried out on the subject. Saeed *et al*. (2007) gave an excellent revision of the works on parasites of Iraqi amphibians. The papers that deal with *Rana esculenta* are (Sauod and Roshdy 1969, 1970); with *Rana ridibunda* are (Dauood, 1974; Al-Barwari and Nassir, 1983; Hamad, 1985; Molan *et al*., 1989; with *Hyla arborea* are (Dauood, 1974; Al-Barwari and Nassir, 1983) and finally with *Bufo viridis* (Dauood, 1974; Hamad, 1985; Al-Alousi, 1994; Rahemo and Ami, 1995).

The present work aims to investigate about the helminth parasites of the green toad in Baghdad area.

MATERIALS AND METHODS

A total of 25 adult specimens of the green toad *Bufo viridis* were collected at Bab Al-Muadham, Baghdad City, Central Iraq during the period May 2006 to March 2008.

The toads were immediately transferred to the laboratory, sacrificed and dissected as soon as possible. All viscera were removed and each placed in petri dish with normal physiological saline. The viscera were examined for helminths under a dissecting microscope. The lungs were cut and checked out for infection. The recovered helminthes were cleaned carefully. Cestodes were fixed in 70% alcohol while being slightly pressed between two glass slides, stained with acetocarmine, dehydrated in a series of alcohol concentrations of 80% , 90% and 100%, cleared in xylene and mounted in Canada balsam. The nematodes were fixed in 70% alcohol and cleared in lactophenol.

RESULTS AND DISCUSSION

Table 1 summarizes the results of recovering helminth parasites from the green toad specimens collected in Baghdad area. This would show that 12 (including 7 males and 5 females) out of 25 specimens (48%) were found infected with one or more species of either cestodes or nematodes or both.

Although cestodes appeared only in three females along with nematodes in two cases, the small size of the sample host specimens could not allow us to withdraw any conclusion in regard to the effect of host sex on the infection..

It is obvious that overall infection with nematodes is far exceeds that with cestodes since all of the infected specimens contains one or more species of the recorded nematodes in this study. Infection rate with nematodes is 44% while that of cestodes 12%.This is in agreement with Saeed *et al.* (2007) who examined 73 host specimens in northern Iraq.

***Proteocephalus* sp.:** it is a larval stage cestode appeared once in a specimen acquired a triple infection of this cestode, the cestode *Nematotaenia dispar* and the nematode *Cosmocerca commutata*. This species was reported from *B. viridis* and *Hyla arborea* in Turkey (Yildirimhan, 1999b ; Dusen and Oz, 2004). Other records include Moravec and Kaiser (1995) from the reptile *Eleuthendactylus* sp. in the Indies, South America, and Muzall *et al*. (2001) from *Rana clamitans* from U.S.A.

Table1: Helminth parasite group and species, infection sites, infection rate, intensity, range and sex ratio.

Helminth species	Infection site	No. hosts infected	% infection	No. parasites/host(range) (male: female)
Cestodes				
Proteocephalus sp.	Small intestine	1	4	2
Nematotaenia dispar	Small intestine	3	12	1.3 (1-3)
Nematoda				
Oswaldocruzia filiformis	intestine	3	12	5 (1-8)(3:12)
Cosmocerca commutata	intestine	5	28	4 (3-12)(3:11)
Cosmocercoides variabilis	rectum	4	20	3.3 (1-8)(3:8)
Rhabdias bufonis	lung	1	4	2 (0:2)

Nematotaenia dispar (Goeze, 1782) : In his revision of the Cyclophyllidean family Nematotaeniidae , Jones (1987) mentioned that this cestode is a variable species which covers a broad geographical range extending throughout North Africa, the Middle East, Europe, India South East Asia and U. S. A. It is widely distributed among amphibian and reptilian hosts. Although it is primarily a parasite of bufonidae (e.g. *Bufo alvarius , B. americanus, B. bufo, B. cinereus, B. congatus , B. lentigenosus, B. melosticus, B. punctatus , B. regularis, B. terrestris, B. viridis, B. vulgaris*) (Douglas, 1958; Al-Barwari and Nassir, 1983; Jones, 1978; Mashaii, 1999; Goldberg *et al* . 1996 ; Yildirimhan, 1996 ; Vashetko and Siddikov, 1999; Al-Sorkhy

and Amr, 2003), it was also reported from *Acris gryllis* and *Hyla arborea* (Hylidae), *Rana agilis, R. camerani, R. dalmatina, R. halecina, R. pipiens, R. temporaria* and *R. virescens* (Ranidae), *Pleobates fuscus* (Pleobatidae), *Mertensiella caucasica* , *Salamandra salamandra* and *Triturus alpestris* (Salamandriidae), *Menobranchus maculates* (Proteidae) and from the lizards *Varanus griseus* (Varanidae) and *Platydactylus guttatus* (Gekkonidae) (Jewell, 1916; Douglas, 1958; Dollfus, 1965; Al-Barwari and Nassir, 1983; Jones, 1987; Mashaii, 1999; Yildirimhan *et al*., 2005a , 2006b)

In regard to its presence in the green toad, it seems that its distribution coincides with the geographical distribution of the green toad since it was recorded in France, Iran, Iraq, Kuwait ,Tunisia, Turkey and U.S.A. Saeed *et al.* (2007) found it in 56% of examined specimens while infection rate with parasite in present study is 12%. This may reflects wide ecologic and consequently biological differences between the two collection sites, the northern and central Iraq. Jones (1987) examined only one specimen from Iraq mentioning that the number of the paruterine capsules is 30-33 and the eggs per capsule are 2-5. The paruterine capsules of our cestode specimens are around 20. In view of the present results in regard to number of paruterine capsules and the number of eggs per capsule, it seems that we have in Iraq more than one infraspecific rank of the cestode species although all of specimens of Jones (1987) and the present work were from *B. viridis*.

Oswaldocruzia filiformis (Goeze, 1782) (Fig. 1 A & B) : the infection rate in this study is 14.3%. This seems low when compared with that reported by Saeed *et al*. (2007). This is may related to smaller host sample size of this study (25) compared with (73) of their study. This nematode is a cosmopolitan parasite of amphibians and reptiles (Saeed *et al*., 2007). It was first recorded in Iraq by Al-Barwari and Nassir (1983) from *B. viridis*.

Also, it has been reported from the same host (Walton, 1935 in Europe; Yildirimhan, 1999b in Turkey), from *Bombina bombina ; B. varigata* (Walton , 1935 in Europe ; Kirin and Buchvarov, 2002) *Bufo americanus , B.bufo ; B.crucifer; B. hemiphrys ; B. viridis ; B.valliceps* (Walton , 1935 in Europe ; Bursey and Goldberg, 1998 in Canada; Yildrimihan and Karadeniz, 2007 in Turkey) *Rana arvalis isaitschikovi* (Walton, 1938 in Europe) *R. camerani* (Yıldırımhan *et al.*, 2006b in Turkey) R. dalmatina (Kirin, 2003 in Europe) *R. macrocnemis; R. esculenta;* (Walton, 1935, 1938 in Europe) *R. ridibunda ; R. temporaria* (Walton ,1935; 1938; Kirin and Buchvarov , 2002 in Europe) *Hyla arborea; Pleobatus fuscus; Salamandra atra ; S. salamndra ; Triturus cristatus ; T. vulgaris* (Walton , 1935 in Europe) *Ceratophrys dorsata and Leptodactylus ocellatus* (Walton , 1935 in Brasil).

Cosmocerca commutata (Diesing, 1851) (Fig. 2): Its infection rate in this study is 23.8%. This seems very high compared with that given by Saeed *et al.* (2007) from *Rana ridibunda* in the north of Iraq. Both smaller sample size of this study along with different host and locality may play role in this difference. It was reported from *B. viridis* (Mashaii, 1999 in Iran; Yildirimhan, 1999b in Turkey), from *Hyla arborea* (Dusen and Oz, 2004 in Turkey) and from *Rana ridibunda* (Vashetko and Siddikov, 1999 in Uzbekistan; Kirin, 2003 in Bulgaria; Saeed *et al*., 2007 in Iraq). It was also reported from *Bufo marinus ; Leptodactylus typlaonius* in Brazil and from *Bombina bombina; Bufo bufo; B. viridis; Hyla arborea; Pelobates fuscus; Rana esculenta; R. temporaria; Salamandra atra; S. salanzandra and Triturus cristatus* in Europe (Walton , 1933).

Cosmocercoides variabilis (Harwood, 1930) (Fig. 3 A.; B & C): it was reported from different amphibian families i.e.: Ambystomatidae; Bufonidae; Plethodontidae,

Ranidae and Salamandridae (Joy and Bunten, 1997; Bursey and DeWolf, 1998; Bolek and Coggins, 2003; McAllister and Bursey, 2004). It was reported in U.S.A. from *Acris grylus* ; *Ambystoma microstomum; A. opacum; Ambystoma talpoideu, Bufo americanus americanus, Bufo borea, B. hemiophrys, B. quercicus, B. terrestris,B. valliceps Eurycealongicauda E. lucifuga Gastrophryne aredata , G. carolinensis, Hyla cinerea, H. squirella, Pseudacris trieriata. Rana aesopus, R. areolata, R. aurora, R. catesbeiana, R. clamitans, R. palustris, R .sphnocephala, R. sylvatica, Triturus meridionalis and Triturus torosus (*Walton, 1933; 1938; Bursey and DeWolf 1998; Bolek and Coggins, 2003 McAllister and Bursey,2004) .

Rhabdias bufonis (Schrank, 1788) **:** Our results showed females of *Bufo viridis* got more numbers of this worm than that of their counter in males , in contrast with Saeed *et al*.(2007) who found that males of *B. viridis* collected from many localities of northern Iraq acquired more *R. bufonis* than females

Adults were recovered from the lungs. It is a worldwide parasite of toads and frogs (Saeed *et al*., 2007). Fifteen species of *Rhabdias* have been reported from members of Bufonidae but this species seems not specific to the host family Bufonidae since it infects members of Ranidae (Kirin, 2003; Yildirimhan, 2006 a; b). It was reported from *B. viridis* (Walton ,1933 ; in Europe; Yildirimhan,1999b in Turkey ; Mashaii , 2005 in Iran and Saeed *et al*., 2007) *Bombina bombina; B. bufo* (Walton,1933 in Europe; Yildirimahan and Karadenis, 2007 in Turkey) *; B. americanus* (Walton,1933 in U.S.A) *Hyla arborea japonica; Pelobates fuscus* (Walton, 1933 in Japan) *Rana arualis isaitschikovi* (Walton,1938 ; in Europe) , *Rana camerani* (Yildirimhan *et al*., 2006 b in Turkey) R. esculenta ; R. japonica (Walton, 1933, 1949 in Europe and Japan) *R. macrocnemis* (Walton , 1933 in Europe ; Yildirimhan *et al*., 2006 a in Turkey) *R. nigromaculata, and R. rugosa* (Walton, 1933 in Japan) *R. ridibunda* (Walton, 1933 in Turkestan; Kirin , 2003 in Europe) and *R. temporaria* (Walton, 1933 in Europe).

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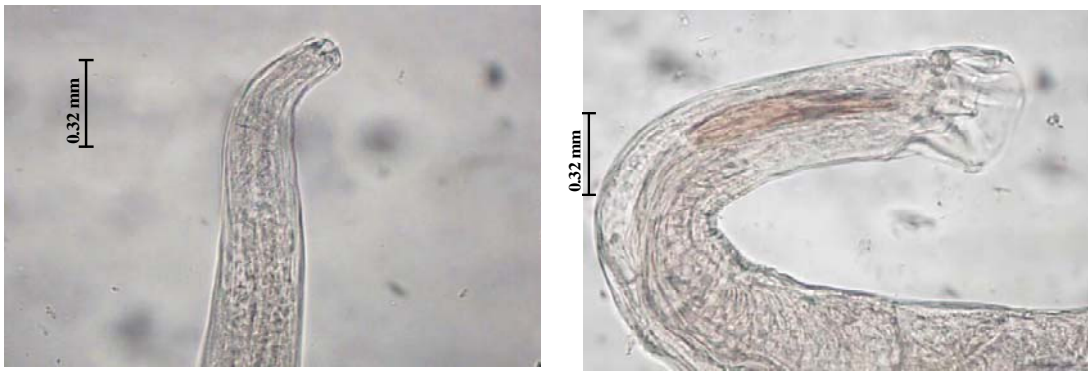

Fig. 1: *Oswaldocruzia filiformis* A - Anterior end B - Posterior end of male

Fig. 2: *Cosmocerca commutate* Posterior end of the female

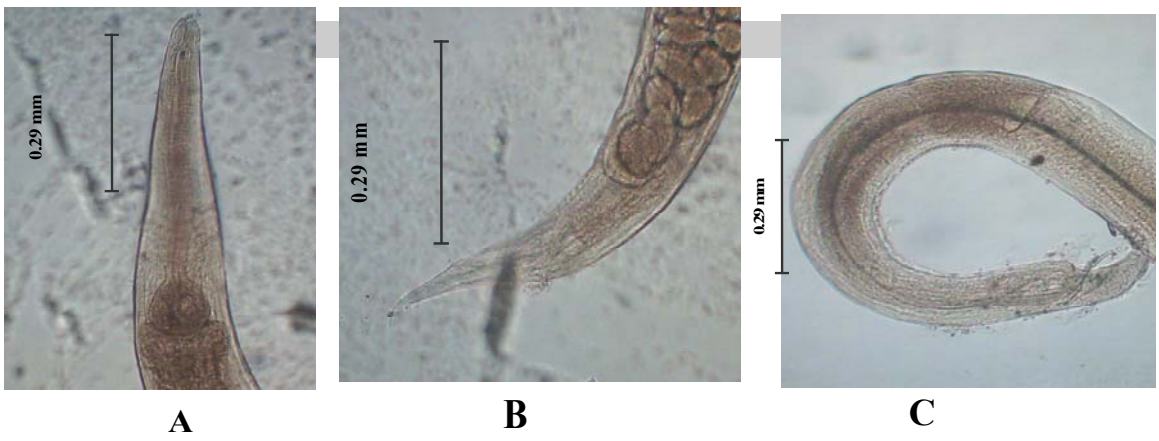

Fig. 3: *Cosmocercoides variabilis* A - Anterior end. B - Posterior end of the female C- Posterior end of the male

ARABIC SUMMARY

طفيليات العلجوم الاخضر *Bufo viridis* Laurenti, 1768 في مدينة بغداد وسط العراق

محمد كاظم محمد و ازهار احمد الموسوي و سهاد ياسين جاسم
مركز بحوث ومتحف التاريخ الطبيعى العراقى – جامعة بغداد- بغداد – العراق

خلال فحص لعينة صغيرة من العلجوم الاخضر والتي تم جمعها من مدينة بغداد ، وسط العراق تم الحصول على نوعين من الديدان الشريطية وهما : *Proteocephalus* sp. و *Nematotaenia dispar* واربعة انواع من الديدان المدورة : *Oswaldocruzia filiformis* و *Cosmocerca commutata* و *Cosmocercoides variabilis* و *Rhabdias bufonis*