Prevalence of some nematode parasites in the Egyptian tortoise (*Testudo kleinmanni*)

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Abstract:

A total of 50 apparently healthy Egyptian tortoises were taken from five different localities in Egypt, from: Port Saied pet animal shops, Elsayeda Aesha market, Ismailia pet animal shops, Cairo pet animal shops and Giza pet animal shops. The parasitological examination revealed the presence of nine nematode parasites, *Tachygonetria paradentata, Alaeuris asirensis, Thelandros massae, Thelandros species, Physaloptera species, Atractis species, Mehdiella microstoma, Mehdiella species* and *Angusticaecum holopterum.* The prevalence of these nematode parasites in the five groups was tabulated. This study recommended the periodical examination of tortoises for parasitic infestation and improving their environment in captivity.

Introduction:

Captivity is stressful, predisposing tortoises to parasitic infestations. Crowding of hosts in captivity, creating an increased risk of reinfection, may lead to heavy parasitism and severe clinical disease and even death ***(Sátorhelyi and Sréter, 1993).***

Wild and captive reptiles are frequently infected with various endoparasites, many of which are minimally pathogenic. However, the stress of captivity, improper husbandry and poor sanitation can lead to serious diseases and ultimately death in heavily parasitized captive reptiles ***(Wilson and Carpenter, 1996).***

Gastrointestinal tract parasitism is the most common disorder of the digestive system seen in pet reptiles. So, reptiles are hosts to a huge number of parasites **(*Bernard and Upton, 1994 and Willette et al, 1995).***

The aim of this work is to study the prevalence and morphology of some nematode parasites that can affect the species Egyptian tortoises in captivity.

Material and methods:

50 Egyptian tortoises (*Testudo kleinmanni*) were collected from

five different localities in Egypt, 10 from Port Saied (group 1), 10 Ismailia (group 2), 10 Cairo (group 3), 10 Giza pet animal shops (group 4) and 10 Elsayeda Aesha market (group 5).

These tortoises were subjected to ante-mortem and post-mortem parasitological examination. Fecal examination was carried out by direct smear method and flotation technique according to ***Levine (1985).*** The visceral organs especially gastrointestinal tract were examined carefully for helminth parasites and any worms were collected, washed and counted according to ***Reid (1962)*** *and* ***Bisset et al, (1996)***. The nematode parasites were fixed in 5% glycerol-alchol 70%, cleared in lactophenol and permanently mounted in glycerol- gelly according to ***Pence and Dowler (1979).***

Results and Discussion:

Prevalence of the detected helminth parasites

Parasitological findings of the examined tortoises revealed the identification of nine helminthes parasites. Results in Table (1) recorded the total prevalence of infection was (100%) in all groups, worm count was 3820, 3312, 1517, 3944 and 3705 while the mean intensity of infection of the examined groups was 382, 331.2, 151.7, 394.4 and 370.5 respectively in the examined groups.

The prevalence of the detected nematode parasites in groups 1, 2, 3, 4 and 5 was, *Tachygonetria paradentata* 70, 70, 40, 90 and 80%; *Alaeuris asirensis* 40, 20, 20, 60 and 30%; *Thelandros massae* 20, 10, 0.0, 30, 60 and 0.0%; *Thelandros* species 50, 20, 0.0, 50 and 0.0%; *Physaloptera* species 10, 0.0, 0.0, 50 and 50%; *Atractis* species 0.0, 70, 0.0, 70 and 60%; *Mehdiella microstoma* 50, 30, 30, 20 and 60%; *Mehdiella* species 100, 80, 70, 100 and 100% and *Angusticaecum holopterum* 0.0, 0.0, 10, 0.0 and 0.0% in the five groups respectively (Table, 2).

Traversa et al (2005) in their study on 13 *Testudo hermanni hermanni*, found 3(23%) tortoises harboured *Tachygonetria longicollis*, 1(7.7%) harboured *Tachygonetria conica* and 1(7.7%) harboured *Tachygonetria palearcticus*, while in the present study, *Tachygonetria paradentata* was found in a range of 40-90% in the five groups. These results were nearly similar to that of ***Rataj et al (2011)*** who found *Tachygonetria* species in 33.3% - 92.5% in tortoises.

The high prevalence of *Tachygonetria* up to 90% in the current study concurs with the findings of ***Baker et al (1998)*** who evaluated eleven fecal samples from wild Sonoran Desert tortoises where *Tachygonetria* species (pinworm) ova were identified in all fecal samples.

In addition, ***Mader (1996); Bouamer and Morand, (2002)*** *and* ***Dove et al (2002)*** confirmed that *Tachygonetria* species is common in herbivore reptiles and this

oxyurid nematode have developed a commensal relationship with its host.

Traversa et al (2005) recorded the oxyurid nematode *Atractis dactyluris* in 53.8% of *Testudo hermanni hermanni* and in 16.6% of *Testudo hermanni boettgeri* while in the current study, *Atractis* species was found in Egyptian tortoises in a range of 0.0 -70% in the five tortoises groups.

The presence of Atractids in tortoises is of importance since these nematodes have been caused significant morbidity and mortality in tortoises bred in captivity; also Atractids are viviparous, being able to induce internal autoinfections, this enhancing their pathogenicity in stressed or debilitated animals ***(Rideout et al, 1987).***

Also, ***Traversa et al (2005)*** found *Mehdiella uncinata* in 7.7% of *Testudo hermanni hermanni* while in the current study, *Mehdiella* species was found in 70 - 100% of the tested tortoises and, *Mehdiella microstoma* was found in 20 - 60% of the examined Egyptian tortoises.

In the same study, *Alaeuris numidica* adults were found in the feces of two *Testudo graeca* (15.3%), while four animals harbored the ascarid *Angusticaecum holopterum* (30.6%), also *Alaeuris numidica* and of *Mehdiella microstoma* adult worms were retrieved in the feces of two *Testudo marginata* (33.3%), these results are in line with that of the current study as *Alaeuris asirensis* was found in a range of 20- 60% and *Angusticaecum holopterum* in 0.0-10% of the examined tortoises.

Occurrence of *Angusticaecum holopterum* in the current study concurs with results of ***Holt et al (1979)*** who found specimens of *Anguisticecum* species in the same species of tortoise and without clinical signs, the reason for the no appearance of clinical signs here is due to low parasite burden but if it is high may result in gastrointestinal disturbance and obstruction of colon and can be of life threatening ***(Pannikar and Sproston 1941; Forstner 1960 and Sprent 1980).***

From the data shown in Table (2), *Angusticaecum holopterum* was found in 10% of the cases lower than that obtained by ***Rataj et al (2011)*** who found *Angusticaecum* species in *Testudo graeca* and *T. hermanni* in 20.3%, but was higher than that obtained by ***Pasmans et al (2008)*** in 2.7% of captive chelonians.

The current study findings concerning oxyurids were somewhat similar to that obtained by ***Rataj et al (2011)*** who found these frequently in Hermann's tortoises (92.5%). Also, ***Satorhelyi and Sreter(1993)*** found oxyurids (*Atractis, Mehdiella, Tachygonetria* and *Thaparia* species) in (69%) of 71 tortoises. On the other hand, our findings of *Angusticaecum holopterum* (10%) were much higher than their findings (2.8%).

Although lots of parasites were recorded in the current study, all

examined tortoises were apparently healthy, this is may be because of what ***Mitchel and Figueroa (2005)*** reported that gastrointestinal helminthes are frequently found in chelonians and generally are mild pathogens also, ***Jacobson (2007)*** added that GIT helminthes rarely involved as significant pathogen.

Morphological criteria of the helminth parasites:

The detected nematode parasites were identified as seven oxyurids, one spirurid and one ascarid. The oxyurid nematodes were, *Tachygonetria paradentata* (Fig. 1, 2, 3& 4) *Alaeuris asirensis* (Fig. 5 to 10), *Thelandros massae* (Fig.11 to 13), *Thelandros* species (Fig.14 to 16), *Atractis* species (Fig.19 to 22), *Mehdiella microstoma* (Fig. 23&24), *Mehdiella* species (Fig. 25 to 28). The detected spirurid nematode was *Physaloptera* species (Fig. 17&18). The ascarid nematode was *Angusticaecum holopterum* (Fig. 29 to 32).

These nematodes were identified depending upon the morphological criteria, size and diagnosis of both adult male and female and their organs especially the cephalic extremity and esophagus cited in keys and literatures ***(Travassos, 1925; Adamson and Nasher, 1984; Barus and Johnson, 1973; Baylis, 1920; Thapar, 1925; Bouamer and Morand, 2002; Markov et al., 1962; Sprent, 1980).***

All the detected nematodes were identified to species level except four types, *Thelandros* species, *Atractis* species, *Mehdiella* species and *Physaloptera* species which were identified to the genus level only because the dimensions and morphological criteria of these four nematodes were overlapping with other species in the genera.

Table (1): The total prevalence and mean intensity of infection of the detected nematode parasites in the all examined groups

Group No.	No. of infested tortoises	Total prevalence	Worm count	Mean Intensity of infection
1	10	100%	3820	382
2	10	"	3312	331.2
3	10	"	1517	151.7
4	10	"	3944	394.4
5	10	"	3705	370.5
Total		"	16298	325.96

Table (2): The prevalence of the detected nematode parasites in all groups

Helminth nematode species	No. of infested tortoises					Prevalence				
	Gr. 1	Gr. 2	Gr. 3	Gr. 4	Gr. 5	Gr. 1	Gr. 2	Gr. 3	Gr. 4	Gr. 5
Tachygonetria paradentata	7	7	4	9	8	70 %	70	40	90	80
Alaeuris asirensis	4	2	2	6	3	40	20	20	60	30
Thelandros massae	2	1	3	6	0	20	10	30	60	0
Thelandros species	5	2	0	5	0	50	20	0	50	0
Physaloptera species	1	0	0	5	5	10	0.0	0	50	50
Atractis species	0	7	0	7	6	0.0	70	0	70	60
Mehdiella microstoma	5	3	3	2	6	50	30	30	20	60
Mehdiella species	10	8	7	10	10	100	80	70	100	100
Angusticaecum holopterum	0	0	1	0	0	0.0	0.0	10	0.0	0.0

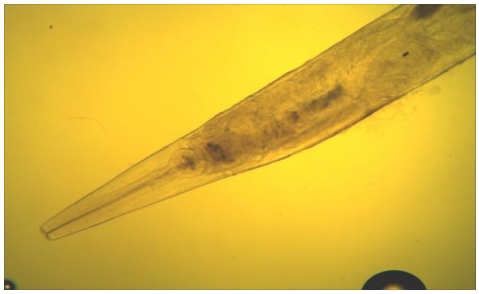


Fig.(1): *Tachygonetria paradentata* Female; anterior end X10
Fig. (2): *Tachygonetria paradentata* Female; posterior end X10

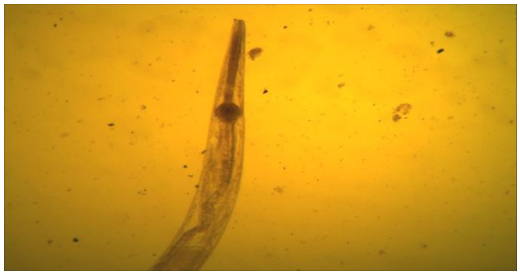


Fig.(3): *Tachygonetria paradentata* Male; anterior end X10
Male; Fig.(4): *Tachygonetria paradentata* posterior end X10

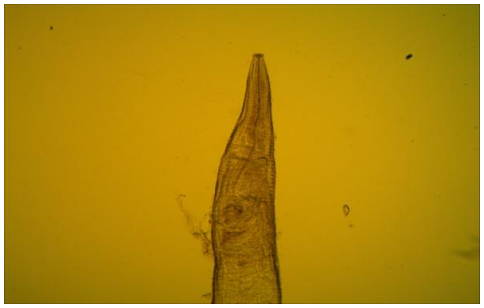
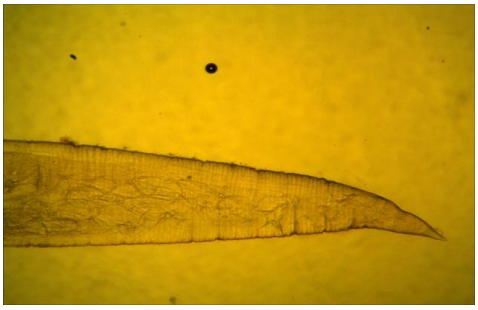



Fig. (5): *Alaeuris asirensis* Female; anterior end X10
Fig. (6): *Alaeuris asirensis* Female; posterior end X10

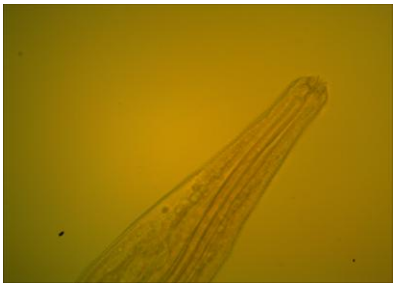
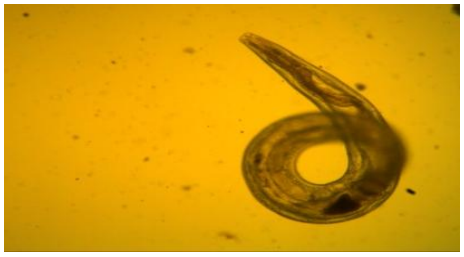



Fig. (7): Alaeuris asirensis Male; anterior end X10
Fig. (8): Alaeuris asirensis Male; anterior end X40


Fig. (9): Alaeuris asirensis Male; posterior end X10
Fig. (10): Alaeuris asirensis Male; posterior end X40


Fig. (11): Thelandros massae Female; anterior end X10
Fig. (12): Thelandros massae Female; posterior end X10



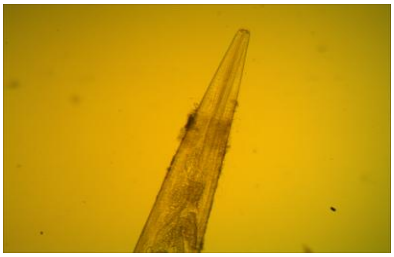


Fig. (13): Thelandros massae male X4
Fig. (14): Thelandros species Female; anterior end X10

Fig. (15): Thelandros species Female; posterior end X10
Fig. (16): Thelandros species male X4

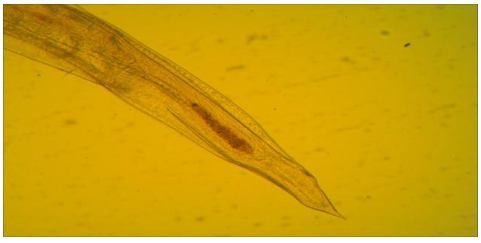


Fig. (17): Physaloptera species Female; anterior end X10
Fig. (18): Physaloptera species Female; posterior end X10

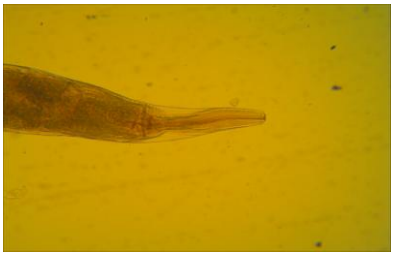


Fig. (19): Atractis species Female; anterior end X10
Fig. (20): Atractis species Female; posterior end X10

Fig. (21): Atractis species Male; anterior end X10
Fig. (22): Atractis species Male; posterior end X10

Fig. (23): Mehdiella microstoma Female; anterior end X10
Fig. (24): Mehdiella microstoma Female; posterior end X10

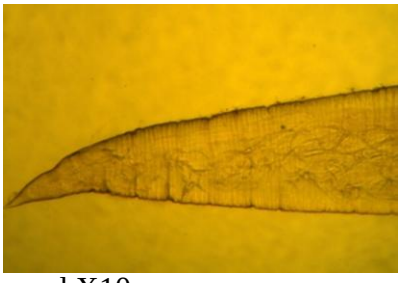


Fig. (25): Mehdiella species Female; anterior end X10
Fig. (26): Mehdiella species Female; posterior end X10

Fig. (27): Mehdiella species Male; anterior end X10
Fig. (28): Mehdiella species Male; posterior end X10

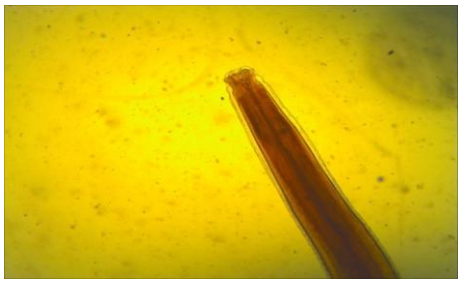
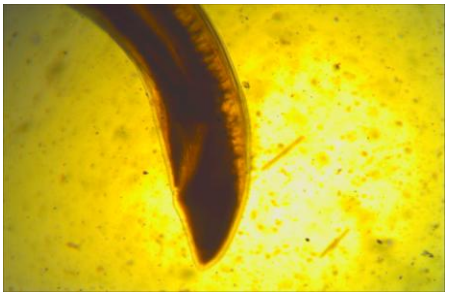



Fig. (29): Anguisticaecum holopterum Female; anterior end X10
Fig. (30): Anguisticaecum holopterum Female; posterior end X10

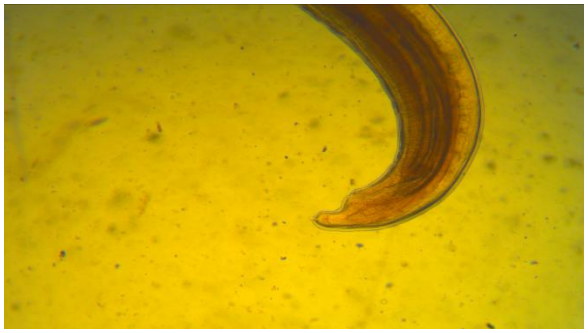



Fig. (31): Anguisticaecum holopterum Male; anterior end X10
Fig. (32): Anguisticaecum holopterum Male; posterior end X10

Conclusion

In this study, it was noticed that enormous number of nematode parasites were identified in apparently healthy tortoises, although, they were collected from different localities vary wildly in management. This agreed with ***Ellis and Seal (1996)*** who reported that, the wild animals become very susceptible to many sorts of infection in captivity.

Regular parasitological examination for Egyptian tortoises should be done and providing tortoises with clean suitable food and improving their environmental conditions to conserve this valuable pet animal.

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الملخص العربي

مدى إنتشار الإصابة ببعض الديدان الخيطية في السلاحف المصرية (تستودو كلاينماني)

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تم تجميع ٥٠ سلحفاة من السلاحف المصرية و كانوا بصحة جيدة ظاهريا من مناطق مختلفة في مصر تم تقسيمها لخمس مجموعات: مجموعة بورسعيد لمتاجر الحيوانات الأليفة ، ومجموعة سوق السيدة عائشة لمتاجر الحيوانات الأليفة ومجموعة الإسماعيلية لمتاجر الحيوانات الأليفة ، و مجموعة القاهرة لمتاجر الحيوانات الأليفة و مجموعة الجيزة لمتاجر الحيوانات الأليفة. .كشف الفحص الطفيلي عن وجود تسعة أنواع من الديدان الخيطية لتاكيجونيتريا بارادينتاتا ، الوريس اسيرينسيس ، ثيلاندروس ماسي ، نوع ثيلاندروس ، نوع فايزالوبتيرا ، نوع أتراكتس، ميديللا ميكروستوما ، نوع ميديللا و أنجوستيسيكام هولوبتيرم. و كان إنتشار الإصابة بالديدان الخيطية في الخمسة مجموعات كالتالي: تاكيجونيتريا بارادينتاتا يتراوح من ٤٠ - ٧٠% ، الوريس اسيرينسيس يتراوح من ٢٠-٦٠%، ثيلاندروس ماسي يتراوح من صفر - ٦٠%، نوع ثيلاندروس يتراوح من صفر - ٥٠%، نوع فايزالوبتيرا يتراوح من صفر - ٥٠% ، نوع أتراكتس يتراوح من صفر -٧٠% ، ميديللا ميكروستوما يتراوح من ٢٠ - ٦٠% ، نوع ميديللا يتراوح من ٧٠ - ١٠٠% و أنجوستيسيكام هولوبتيرم يتراوح من صفر - ١٠%. و أوصت الدراسة بضرورة الفحص الدوري الطفيلي للسلاحف المصرية في الاسر و تحسين البيئة لها و توفير ظروف معيشية جيدة حفاظا عليها.