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The Relationship between Length of Large Scale Tongue Sole *Cynoglossus arel* (Bloch *et* Schnieder) with Infection with Two Nematodes (Genus: *Hysterothylacium* Ward *et* Magath, 1917) from Arabian Gulf, Iraq

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Abstract. A total of 202 large scale tongue sole *Cynoglossus arel* (Bloch *et* Schnieder, 1801) were collected from Iraqi marine territorial water, Khor Al-Umamia from July 2004 until June 2006. The fish was grouped according to their length into eight categories. The results showed that the first two groups were negative (un infected) by *Hysterothylacium reliquens* (Norris *et* Overstreet, 1975) and *Hysterothylacium* sp. larva type BA. In *H. reliquens* the prevalence increased from 3.7 % in the 3rd length group until 66.6 % in last length group, while the mean of intensity generally low in all length groups and it was fluctuated between 1.67 and 5 in the fifth length group (241-260) cm and fourth length groups (221-240) respectively. Prevalence and mean intensity of *Hysterothylacium* sp. larva type BA increased with length of the host till the sixth group (261-280) cm, when it reach to the maximum value, then the infection decreased in the last two groups. The changes in the infection with various length groups were discussed according to the shifting in the food items including different intermediate or transport host with increasing of the host length.

keyword: *Cynoglossus arel*, parasite, nematode, marine fish, Iraq.

Introduction

Large scale tongue sole *Cynoglossus arel* (Bloch *et* Shneider, 1801) commonly reach to 30 cm and maximum to 38 cm, inhabits muddy and sandy bottoms of the continental shelf down to 125 m, enters estuaries and tidal rivers and feeds predominantly on bottom-living invertebrates (10).

Many local studies were carried out on ecology of fish parasites, but that dealt with nematodes were few (4; 11; 14; 3; 15; 17; 2; 5; 1; 8 and 6). All these studies except the last two were depended on the third larval stage of *Contracaecum* sp. in fresh water. Hence only Bannai (8) and Ali (6) studied ecology of marine nematodes, so the following article was designed for this purpose.

Materials and methods

A total of 202 large scale tongue sole *C. arel* were collected from Khor Al-Ummia North- west of the Arabian Gulf (29◦ 50'

-30◦ 10' N and 48◦ 30'-48◦ 45') during the period from July 2004 to June 2006.
Fishes were dissected and nematodes were obtained from the intestine of fresh fish specimens and after being washed in physiological saline. They were fixed in hot 4% formaldehyde, stored in 70% ethanol and cleared in glycerin (16). BA followed the scientific name of parasites refer to the first (=A) of this genus recorded previously from Basrah (=B) by Ali (6). Fullness of fish's stomach determined according to Hynes (13). Host classification followed Carpenter *et al*. (10). Ecological terms followed Bush *et al*. (9).

Results

The first two length group of *C. arel* were found not infected (Group1 & 2 in Table, 1; Fig.1-2). The major part of the above fish's food (about 80%) were bivalve mussels. The infection exist in the third length group (more than 201 mm). In *H. reliquens* the prevalence increased from 3.7 % in the 3rd length group until 66.6 % in last length group, while the mean of intensity generally low in all length groups and it was fluctuated between 1.67 and 5 in the fifth length group (241-260) cm and fourth length groups (221-240) respectively. Prevalence and mean intensity of *Hysterothylacium* sp. larva type BA increased with length of the host till the six length group (261-280) cm, when it reach to the maximum value, then the infection decreased in the last two groups.

Table (1): Relationship between length of *C. arel* with infection by *H. reliquens* and *Hysterothylacium* sp. Type BA.

Fish (host)		*H. reliquens*		*Hysterothylacium* sp. Type BA	
Length (mm)	**Number**	**Prevalence %**	**Mean of intensity**	**Prevalence %**	**Mean of intensity**
Less than 180	7	0	0	0	0
180-200	21	0	0	0	0
201-220	27	3.7	2	3.7	2
221-240	44	2.3	5	9.1	1.5
241-260	37	8.8	1.67	11.7	2.5
261-280	25	8	2.5	24	4.5
281-300	35	8.6	4	11.4	5
More than 300	6	66.6	3	16.6	2

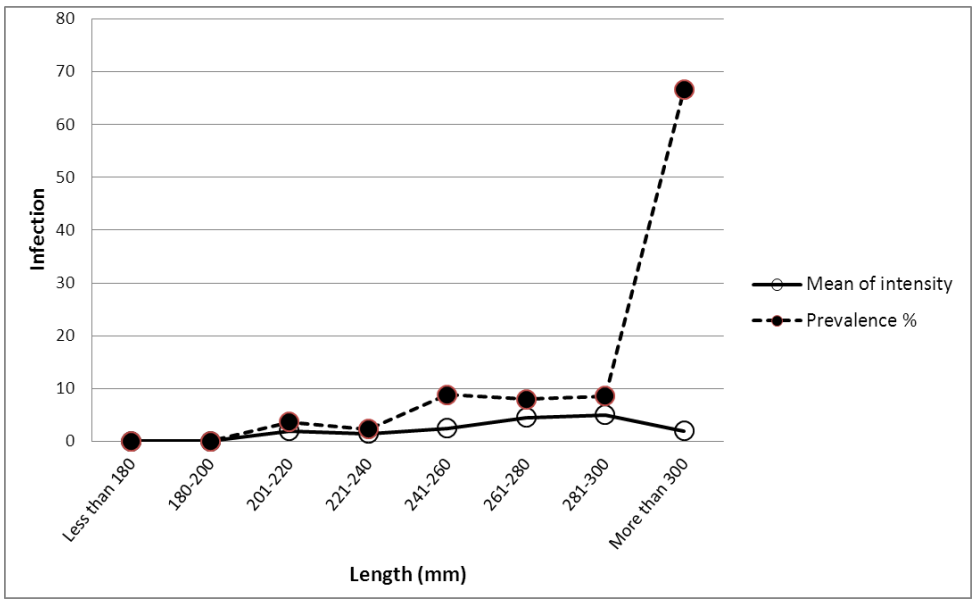

Fig. 1: Relationship between length of *C. arel* with prevalence (%) and mean intensity of *H. reliquens.*

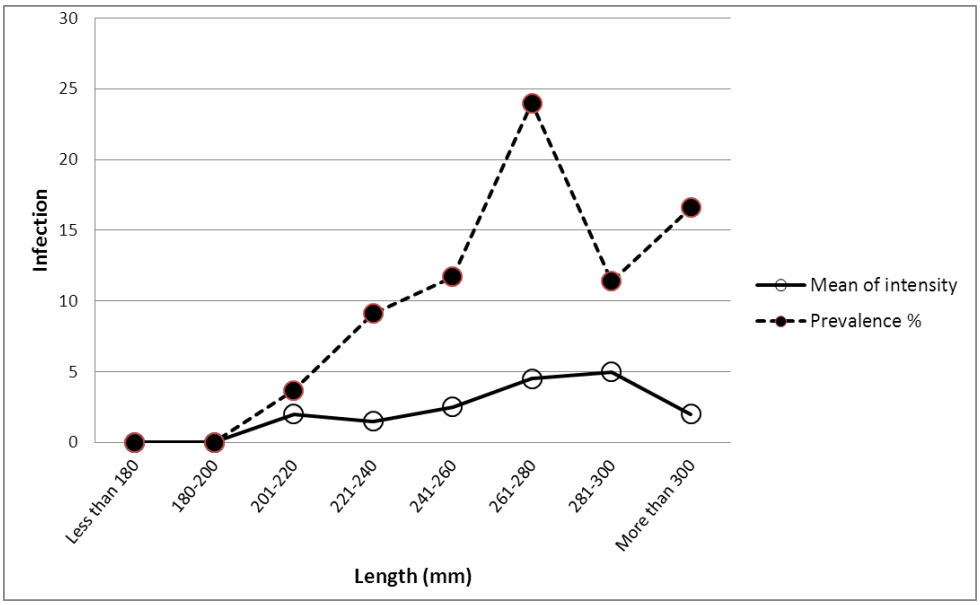

Fig. 2: Relationship between length of *C. arel* with prevalence (%) and mean intensity of *Hysterothylacium* sp. Type BA.

Discussion

Generally the food of all fish groups were bivalves**;** Although, the ratio of the bivalves in that length groups were dramatically varied. Occurrence of bivalves were commonly the main food item in this fish (7; 12).

The first two length groups of *C. arel* were negative from infection. Generally bivalve mussels consist of the majority of food items (about 80%) in the stomach of small lengths of fish (Group1 & 2). The infection was existed in the third length group (more than 201 mm), when the fish changed its food habit, subsequently it feed on new intermediate hosts with both parasites. Brittle star and snail do not exceed on 20% of food of small groups (first and second length groups). The infection with two parasites were existed when found white crab in the food of the third length group. Hence the white crab may be the main intermediate or paratenic host for both parasites. Importance ratio of bivalves were decreased in the food of median and larger sizes of fish, while white crab was increased and consisted the important item in the food of the 5^{th} and 6^{th} length groups. Sea star, *Acanthochiton* and snail were found in the food of the median groups, while Annelida, sea star and brittle star were found in the stomach of 6^{th} group. In the last two length groups was found red crab, which was the most important items in the food of larger fish. The shifting in the food toward red crab were caused two different effects: (i) continuous increasing in the infection with *H. reliquens* may considered red crab as additional appropriate paratenic host; in contrast *Hysterothylacium* sp. BA larva the infection was decreased in the last two group, because of the rarity of white crab (probable paratenic host), and of the availability of the red crab. (ii) Mean intensity of infection with two parasites have not significant changes between different length groups, so relative balance between the number of parasites enter the host with that ending their life span or developing the immunity in the larger fish. Also the size and density of the parasites were limited with size of microhabitat of the host for available of energy between two animals (19). Means the alimentary canal of *C. arel* did not carried more intensity with parasites and with this case the balance might be done between both sides of parasitism relationship, while died larval nematodes (when end their life span) have no chance to exit out of fish's body. However seen such individuals inside host was very rare, so immunity system may invaded them then absorbed them by the host (18).

According to Hussain *et al.*(12) were found relative important index (R.I.I.) for bivalves, crab, shrimp, fish in the food of *C. arel* about 92; 6; 0.3; and 1.8 % respectively in the small to median length groups (82-243mm). Apparently recent study did not recorded nematodes within food items of 293 examined fish. Hence the infection begin in the median and larger fish length when the occurrence of new invertebrates in their food such as sea star, sea urchin, brittle star, annelid and crabs which appear in the present study only. Most of them may be considered as the intermediate or paratenic host in the life cycle of the genus *Hysterothylacium* (16).

References

1- Abdullah, S.M.A. (2002). Ecology, taxonomy and biology of some parasites of fishes from Lesser Zab and Greater Zab rivers in north of Iraq. Ph. D. Thesis, Coll. Educ. (Ibn Al-Haitham), Univ. Baghdad: 153pp. (In Arabic).

2- Al-Alusi, M.A. (1989). A study of alimentary canal helminths of some species of Iraqi fishes from Al-Qadissiya dam lake. M. Sc. Thesis, Coll. Sci., Univ. Baghdad: 110pp. (In Arabic).

3- Al-Hadithi, I.A.W. & Habash, A.H. (1979). Ecological and biological studies on the larval nematode, *Contracaecum* sp. a parasite of the fishes in Basrah, Iraq. (2): Seasonal variations. Bull. Coll. Educ., Univ. Basrah, 1: 309-322.

4- Al-Hadithi, I.A. & Jawad, L.A.J. (1975). Survey on nematode infection of Iraqi fishes. Bull. Basrah Nat. Hist. Mus., 2: 19-25.

5- Ali, A.H. (2001). Pathological effects of helminths parasitic on some local fishes. M. Sc. Thesis, Coll. Agric., Univ. Basrah: 174pp. (In Arabic).

6- Ali, A.H. (2008). Taxonomy of helminth parasites in some marine and freshwater fishes and the relation of some of its with their final hosts in southern of Iraq. Ph. D. Thesis, Coll. Agric., Univ. Basrah: 336pp. (In Arabic).

7- Al-Mousawi, M. H. M. (1997). The biology of *Cynoglossus arel* (Schneider, 1804) and *Pseudorhombus arsius* (Hamilton,1822) in the North- west Arabian Gulf. Iraq. M. Sc. Thesis, Coll. Agric., Univ. Basrah: 90pp. (In Arabic).

8- Bannai, M.A.-A. (2002). Parasites of some marine fishes of Khor Abdulla, north-west Arabian Gulf. M. Sc. Thesis, Coll. Educ., Univ. Basrah: 103pp. (In Arabic).

9- Bush, A. O. ; Lafferty K. D. ; Lotz J .M. ; Shostak, A. W. (1997). Parasitology meets ecology on its own terms: Margolis *et al*. revisited. J. Parasitol., 83: 575-583.

10- Carpenter, K. E.; Krupp, F.; , Jones, D. A. and Zajonz, U. (1997). Living marine resources of Kuwait, Eastern Saudi Arabia, Bahrain, Qatar, and the United Arab Emirates. FAO Species identification field guide for fishery purposes, FAO, Rome. viii + 293 pp., XVII pls.

11- Habash, A.H. (1977). Ecological and biological studies on the larval nematode, *Contracaecum* sp. a parasite of the fishes in Basrah, Iraq. M. Sc. Thesis, Coll. Sci., Univ. Basrah: 98pp.

12- Hussain, N. A. ; Mohamed, A. R. M. and Yousif, U. H. (2007). Dietary overlap of carnivorous fishes in Iraq marine water, northern Arabian Gulf. J. Agr. Sci., 20(2): 1-16.

13- Hynes, H. B. N. (1950). The food of freshwater stiicklebacks (*Gasterosteus aculeatus*) and (*Pygosteus pungitius*) with a review of methods used in studies of food of fishes. J. Anim. Ecol., 19: 36-58.

14- Kasim, M.H.; Rahemo, Z.I. & Warsi, A.A. (1977). The influence of season and the sex of the host on the intensity of some parasites infecting *Cyprinion macrostomum* & *Acanthobrama marmid* fishes from the river Tigris, Mosul (Iraq). Mesopot. J. Agric., 12(2): 133-141.

15- Khamees, N.R. (1983). study of the parasites of *Carasobarbus luteus* (Heckel), *Liza abu* (Heckel) and *Aspius vorax* Heckel from Mehaijeran canal, south of Basrah. M. Sc. Thesis, Coll. Agric., Univ. Basrah: 148pp. (In Arabic).

16- Koi, M. (1993). Aspects of life cycle and morphology of *Hysterothylacium aduncum* (Rudolphi, 1802) (Nematoda,

Ascaroidea, Anisakidae). Can. J. Zool., 71: 1289-1296.

17- Mohamad, E.T. (1989). Study on parasites of the stinging catfish (*Heteropneustes fossilis*) (Bloch, 1797) from Al-Hammar marsh, Basrah. M. Sc. Thesis, Coll. Agric., Univ. Basrah: 101pp. (In Arabic).

18- Moravec, F. (1994). Parasitic nematodes of freshwater fishes of Europe. Prague: Academia, and Dordrecht: Kluwer Acad. Publ., 473 pp.

19- Munoz, G. and Cribb, T. (2005). Infracommunity structure of parasites of *Hemigymnus melapterus* (Pisces: Labridae) from Lizard island, Australia: the importance of habitat and pararsite body size. J. Parasitol., 91(1): 38-44.

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علاقـــة طـــول أسماك اللســـان كبيـــر الحرشفـــة *Cynoglossus arel* (Bloch *et* Schnieder) بالإصابة بنوعين من الديدان الخيطية من جنس *Hysterothylacium* Ward *et* Magath, 1917 من الخليج العربي، العراق

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الخلاصة. جمعت 202 سمكة لسان الثور *Cynoglossus arel* من المياه البحرية الإقليمية العراقية خلال الفترة الممتدة من تموز 2004 حتى حزيران 2006. صنفت الأسماك الى ثمان مجاميع من الأطوال اعتماداً على شدة إصابتها بنوعيـن من الديدان الخيطية. بينت النتائج أن مجموعتا الطول الأولى والثانية كانت خالية من الإصابة. نسبـة الإصابـة للدودة الخيطيـة *Hysterothylacium reliquens* (Norris *et* Overstreet, 1975) ازداد بشكل تدريجي مع زيادة طول الأسماك حتى مجموعة الطول الأخيرة اذ وصلت الإصابة الى إعلى قيمة. بينما معدل شدتها عموماً كانت منخفظة وتذبذبت بين 1.67 و5 في مجموعتي الطول الخامسة (260–241) والرابعة (240–221) على التوالي. طبيعة الإصابة ليرقة الدودة الخيطية *Hysterothylacium* sp. Type BA اذ بدأت نسبة الاصابة ومعدل شدتها بالارتفاع حتى وصلت ذروتها عند مجموعة الطول السادسة (261–280)، ثم Yانخفضت في مجموعتي الطول الأخيرتين. التغيرات في الإصابة بين مختلف الإطوال نوقشت طبقاً لتغير نوع الغذاء وما يصاحبه من تغير في المضيفات الوسطية والناقلة مع التقدم في طول المضيف.