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Monthly variation of the parasiting on carangid fishes in northwest of the Arab Gulf, Iraq

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ABSTRACT

A total number of 600 fishes were collected between September 2011 to March 2012 from Iraqi marine waters north west the Arab Gulf. These fishes were represented ten species: *Alectis indica, Alepes djedaba, A. kleinii, Atropus atropos, Atule mate, Carangiodes armatus, C. bajad, C. malabaricus, Gnathanodon speciosus* and *Megalaspis cordyla.* The result of inspection showed that 107 fish species were infested with nine species of parasites. These included five species of trypanorhynch cestodes: *Callitetrarhynchus gracilis, Callitetrarhynchus* sp., *Floriceps minacanthus, Progrillotia* sp., *Pseudogrillotia spratti*, and one species of larva nematode *Skrjabillanus* sp. Also three species of copepods *Lernanthropus indicus, L. corniger* and *Caligus cordyla*. The present study revealed that the highest prevalence of infection in *M. cordyla* (93.7%) and the lowest prevalence in *C. malabaricus* (6.25%). The present study reports that the highest mean intensity of the parasite was in cestode (4.65) and the lowest occurrence in nematode (1.00).

Key word: Monthly variation, parasites, carangid fishes, Arab Gulf, Iraq.

1) INTRODUCTION

The parasitic diseases affect fish hosts and cause high mortalities in both cultured and wild, and leading to losses which are considered as one of the major barrier against the expanding of fish industry **(Overstreet, 1990).**

It was well known that fish parasites can cause numerous negative effects to their hosts, like pathological, mechanical, chemical and physiological changes (**Williams, 1967**), also parasites may affect the swimming ability of fish hosts **(Russel, 1980).** Lom (1960) reported more than 550 species of parasitic protozoans

from fishes, while **Kabata (1970)** reported 1000 species of crustaceans parasitize fishes. **Cressey (1983)** illustrated that the number of parasitic crustaceans on fishes are more than 3000. **Menzies *et al.* (2002)** reported that parasites and pathogens represent an important source of economic losses for aquaculture in terms of reduced fish growth and increased mortality and also investments in the farming practices and chemicals necessary for prevention. **Dybdahl and Storfer (2003); Sangster *et al.* (2004)** recorded that emphasis in modern fish farming is on ecologically-viable solutions in parasite prevention, where aspects of parasite ecology, such as those underlying their infectivity and virulence (effects on hosts), have an essential role.

According to the local adaptation hypothesis, parasites showed an evolutionary advantage in the arms races over their hosts, due to their shorter generation times, higher mutation rates and larger population sizes **(Dybdahl and Storfer, 2003),** which give them greater evolutionary potential. The information on marine fishes of the Arab Gulf was documented through the works of **Blerad (1944) and Khalaf (1961).**

This study was investigate the prevalence of some parasitic affection on carangid fishes in the northwest part of the Arab Gulf within the Iraqi territorial marine waters.

2) MATERIALS AND METHODS

A total number of 600 fishes were collected from Iraqi marine water, north-west Arab Gulf (latitudes 47° 30′ to 48° 15′; longitude 30° 50′ to 30° 00′) (Fig. 1) by using the trawl net. the period between September 2011 to March 2012 which belong to ten species of carangid fishes (*Alectis indica, Alepes djedaba, A. kleinii, Atropus atropos, Atule mate, Carangiodes armatus, C. bajad, C. malabaricus, Gnathanodon speciosus* and *Megalaspis cordyla*). The identifications were undertaken according to **Carpenter *et al.* (1997).**

After sending the samples to the laboratory, the total length and weighting of fishes were recorded, and then were examined for parasites (digestive system and gill) according to the method adapted by **Amlacher (1970) and Lucky (1977).** Cestodes were transferred with a tissue of fish to tap water to release its hold. Then it was preserved in ethanol 70 % and stained with aceto carmine according to the method by described **Palm (2004),** then mounted in Canada balsam.

Nematodes were washed in physiological saline immediately after collection, and preserved in 70% alcohol for 24 hours and cleared in series of glycerin mixture with water in ratio 20:1, 10:1, 5:1, 1:1 then pure glycerin. Some were cleared in lacto–phenol (lactic acid 20 g, melted phenol crystals 20 g, glycerin 40 g dissolved in 20 cm de-Ionized water) to make morphological studies easier. Copepods preserved in 70% ethanol, and for identification the wooden slid method which recommended by **Humes and Gooding (1964)** was used after clearing the parasites with lacto phenol.

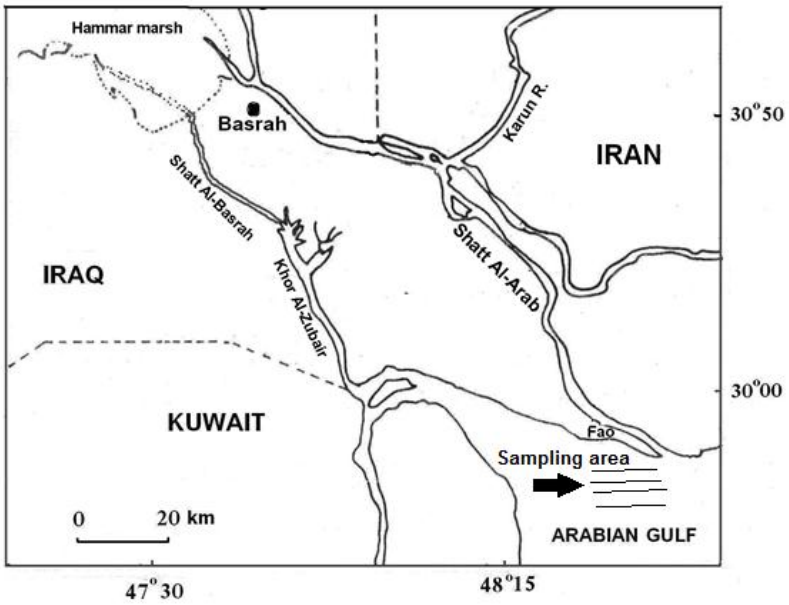

Fig. (1): A Map showing the studying area.

3) RESULTS

3.1. Monthly variations

The present study revealed that the higher prevalence was noticed in October (40.5%) and March (69.4) but the lower prevalence occurred in February (5%), while there was no infection in January (Table 1).

Table (1): The total number of examined and infected fishes with prevalence of infection (cestodes, nematodes and copepods) monthly.

Month	No. of examined fishes	No. of infected fishes	Prevalence (%)
September 2011	50	6	12
October	84	34	40.5
November	100	27	27
December	150	10	6.6
January 2012	80	-	-
February	100	5	5
March	36	25	69.4
Total	**600**	**107**	**17.83**

3.2. The prevalence value according infection (cestodes, nematodes and copepods) per months

In table (2), there was a variable in prevalence of infectedfishes according to the months, the higher prevalence of infection with cestodes, nematodes and copepods it occurred in October and March in *Carangoides malabaricus* and *Megalaspis cordyla* 70% and 93.7% respectively, while the lower prevalence of infection occurred in February in *C. malabaricus* (6.25%). The statistical analysis showed a significant difference under P<0.05.

Table (2): Prevalence of infection (cestodes, nematodes and copepods).

Month	Fish species	No. of examined fish	No. of infected fish	Prevalence (%)
September	*Alepes djedaba*	20	4	20
	Carangoides malabaricus	30	2	6.6
October	*Atropus atropos*	4	0	0
	Alepes djedaba	2	0	0
	C. malabaricus	70	28	40
	Megalaspis cordyla	8	6	70
November	*Gnathanodon speciosus*	12	0	0
	C. armatus	3	2	66.6
	Atule mate	5	0	0
	C. malabaricus	30	10	33.3
	M. cordyla	50	15	20
December	*Atule mate*	20	0	0
	C. bajad	10	0	0
	M. cordyla	100	10	10
	A. atropos	10	0	0
	Alectis indica	10	0	0
January	*M. cordyla*	26	0	0
	C. malabaricus	40	0	0
	Alepes kleinii	10	0	0
	G. speciosus	4	0	0
February	*M. cordyla*	20	0	0
	C. malabaricus	80	5	6.25
March	*M. cordyla*	20	10	50
	C. malabaricus	16	15	93.7
Sum		**600**	**107**	**17.83**
Sig= 0.024				**P<0.05**

3.3. Relationship between sex and prevalence of cestodes, nematodes and copepods

The occurrence of parasites in all months was recorded in female (25.96 %) and in male (10.47%). The prevalence of parasites was significantly differences at (P<0.05, sig= 0.021) (Table 3).

Table (3): Prevalence of parasite (cestodes, nematodes and copepods) according to the sex of fishes.

Total number / Month	Male			Female		
	No. of fish examined	No. of fish infected	Prevalence (%)	No. of fish examined	No. of fish infected	Prevalence (%)
September 2011	20	2	10	30	4	13.3
October	60	10	16.6	24	24	100
November	40	12	30	60	15	25
December	70	4	5.7	80	6	7.5
January 2012	4o	0	0	40	0	0
February	80	2	2.5	20	3	15
March	5	3	60	31	22	70.9
Sum	**315**	**33**	**10.47**	**285**	**74**	**25.96**
Sig= 0.021			**P<0.05**			

3.4. Compaison between the parasites (cestodes, nematodes and copepods)and the mean of intensity

According to the parasite infection, the present study revealed that the high level of intensity was occurred in cestode (4.65), while the low prevalence was found in nematode (1.00), in copepod (1.25). Statistically, there was a significant differences between each under (P<0.05, sig= 0.040) (Table 4).

Table (4): Intensity of parasites (cestodes, nematodes and copepods) and site of infection.

Parasite	Site of infection	Total number of worms	Mean of intensity
Cestoda	Intestine and body cavity	400	4.65
Nematoda	Intestine	1	1
Copepoda	Gills	25	1.25
Total		**427**	**7.9**
Sig= 0.040		**P<0.05**	

3.5. Relationship between fish species and parasites (cestodes, nematodes and copepods)

The study showed that the total of the 86 fish were infected with cestodes and only one fish with nematode, while 20 fishes with copepods infection. The high prevalence occurred in *M. cordyla* (19.23) with cestodes while the low were occurred in *M. cordyla* (3.2) with copepods. As for the *C. malabaricus* the higher level (14.2) occurred in cestodes but the lower level (0.39) presented with nematodes, both *A. djedaba* and *C. armatus*. The result showed a significant difference under P<0.05, sig= 0.0 14 (Table 5).

3.6. The differences between the parasitic infection and intensity

The current study confirmed a variable in the intensity of parasites, the higher level of intensity in cestodes occurred in *Callitetrarhynchus gracilis* (1.62) but the lower occurred in *Floriceps minacanthus* (0.58) as shown in (Table 4). Copepod showed a higher intensity in *Lernanthropus indicus* (1.16) but the lower occurred in *Caligus cordyla* (1.3) (Fig. 3). The statistical analysis showed a significant difference under P<0.05.

Table (5): The prevalence of parasitic n relation to the fish species.

Parasites	No. of infected fish	Fishes species	Prevalence (%)
Cestoda	86	45 *M. cordyla*, 37 *C. malabaricus*, 2 *A. djedaba*, 2 *C. armatus*	19.23 14.45 9.0 66.6
Nematoda	1	*C. malabaricus*	0.39
Crustacea	20	12 *C. malabaricus*, 8 *M. cordyla*	4.6 3.2
Sig= 0.014			**P<0.05**

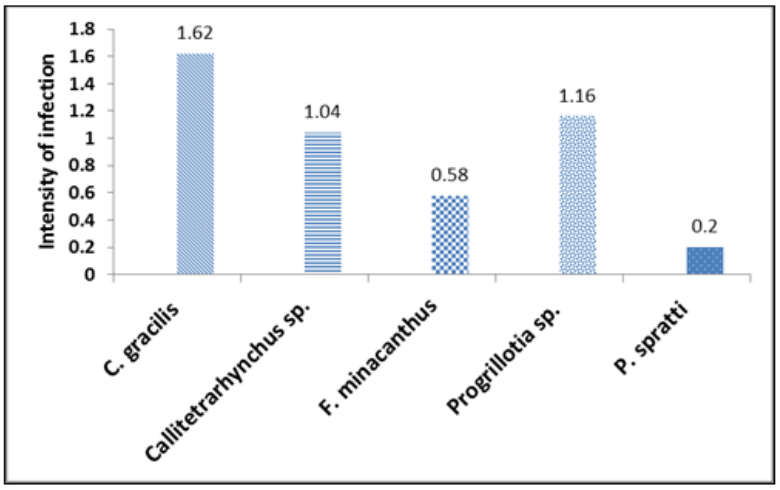

Fig. (2): Intensity of infection in relation to the cestode species.

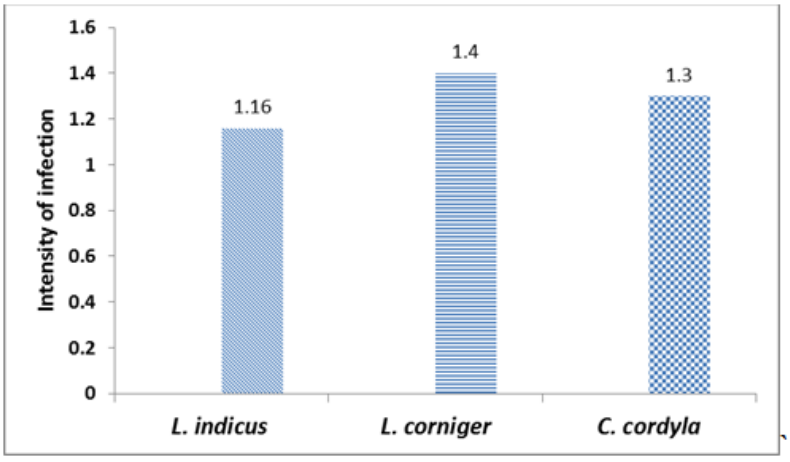

Fig. (3): Intensity of infection in relation to the copepods species.

4) DISCUSSION

The present study showed that the high level of infection in the examined fishes occurred in October and March while the low level of infection occurred in February. There was no infection in fishes in January. This result may be due to the water temperature which in October is high and makes the parasites increase in

number while, in February in characterized with low temperature decreased. **Dogiel *et al*. (1961)** referred to the reason of monthly variation which happened in some parasites, may be due to increasing and distribution of the first intermediate host, also there are many factors come together to change prevalence and mean of intensity such as, entrance of some non-infected fish to the area, death of infected fish or migration performed to decrease the prevalence **(Mackenzie and Abuanza, 1998).** This is the study agreement with **Ali (2001**) who observed variation of prevalence and mean intensity in parasites along the month year.

According to the ten fish species in this study, it shown a variable in the prevalence of infected fishes with monthly, the higher prevalence of infection occurred in *C. malabaricus* and *M. cordyla*, while the lower prevalence that occurred in *C. armatus* and *A. djedaba* while the other six species revealed no infestation along the study period.

This may be due to many reasones such as different reproductive pattrens of each species which was different from month to month also different feeding habits of this family. **Randall (1967)** divided this family by diet into fish feeders and plakton feeders. **Dadzin (2007**) studied food and feeding habit of one species of this family showing the dominace of three major dietory componentes. This reason may perform to difference in prevalance of infection.

In relation to sex of carangid fish, the prevalence of parasites monthly was recorded in females more than males. This may be explained the increasing of infection, which agreement with **Ali (2001).**

According to the parasite infestation, the current study revealed that the higher level of intensity occurs in cestode and the copepod was the lowest while the lower level occurred in nematode. This may be due to the nature of the host and the effected hosts to the parasite depends on parasite species and host or may be due to the nature of life cycles.

REFERENCES

Ali, A. H. (2001). Pathological effects of helminthes parasitic on some local fishes. MSc. Thesis, Coll. Agric., Univ. Basrah, 174p. (in Arabic).

Amlacher, E. (1970). Textbook of fish diseases (English Translator). T. F. H. Publ., Jersey City: 302 pp.

Blerad, P.I. (1944). Fishes of the Iranian Gulf. Danish Scientific Investigation in Iran. J. Selcuk Univ. Vet. Sci., 16(1): 89-92.

Carpenter, K.E., Krupp, F., Jones, D.A. and Zajonz, U. (1997). FAO species identification field guide for fishery purposes Living marine resources of Kuwait, eastern Saudi Arabia, Bahrain, Qatar, and the United Arab Emirates. FAO, Rome, 293 pp.

Cressey, R.F. (1983). Crustaceans as parasite of other organisms. In: Provenzano, Jr. A.J. (E.d). The biology of crustacean, Vol.6: Pathology Acad. Press, New York: 251-273.

Dadzin, S. (2007). Food and feeding habits of the black pomfret, *Parastromateus niger* (Carangidae) in the Kuwaiti waters of the Arab Gulf. Cybium, 31(1): 77-84.

Dogiel, V.A.; Pertrushevski, G.K.; Polyanski, Yu.1. (1961). Parasitology of fishes (English translation by Z. Kabata). Oliver and Boyd Ltd. Edinburgh and London, 384 pp.

Dybdahl, M.F. and Storfer, A. (2003). Parasite local adaptation: Red Queen versus Suicide King. Trends Ecol. Evol., 18: 523-530.

Humes, A.G. and Gooding, R.U. (1964). A method for studying the external anatomy of copepods. Crustacean, 6: 238-240.

Kabata, Z. (1970). Diseases of fishes. Book 1.:Crustacea as enemies of fishes. T.F.H. Publ., New Jersey, 171 pp.

Khalaf, K.T. (1961). The Marine and fresh water fishes of Iraq. Ar-Rabitta Press, Baghdad, 164 pp.

Lom, J. (1960). Protozoa causing diseases in marine fishes. In: Sinezko, S.F. ed.: A symposium on diseases of fishes and shellfishes. Am. Fish, special publ. 5, Washington, D.C., 101-123.

Lucky, Z. (1977). Methods for the diagnosis of the diseases. Amerind Publ. Co. Pvt. Ltd. N.Y., 140 pp.

Mackenzie, K. and Abaunza, P. (1998). Parasites as biological tags for tock discrimination of marine fish: a guide to procedure and methods. Fisher. Res., 38: 45-56.

Menzies, F.D.; Crockford, T.; Breck, O. and Midtlyng, P.J. (2002). Estimation of direct costs associated with cataracts in farmed Atlantic salmon (*salmo salar*). Bull. Eur. Ass. Fish Pathol., 22: 27–32.

Overstreet, R.M. (1990). Metazoan Parasitic diseases: Introductory remarks. In: Pathology in marine science, (Eds. Perkins, F.O. and Cheng, T.C.). Acad. Press, California, PP: 261-266.

Palm, H. W. (2004). The *Trypanorhyncha* Diesing, 1863. PKSPL-IPB Press, Bogor, 710 pp.

Randall, J.E. (1967). Food habits of reef fishes in the West Indies. Stud. Trop. Oceanogr., 5: 655-847.

Russel, L.R. (1980). Effects of *Truttaedacnitic ttruttae* (Nematoda: Cucullanidae) on growth and swimming of rainbow trout *Salmo gairdneri*. Canad. J. Zool., 58: 1220-1226.

Sangster, C.R.; Dove, A.D.M. and Bowser, P.R. (2004). *Diplostomum* in pond-reared walleye *Stizostedion vitreum*- implications of a management strategy for control. Aquaculture, 236: 95-102.

Williams, H.H. (1967). Helminthes diseases of fish. Helminthes- logical Abstracts, 36: 261–295.

التغيرات الشهرية لطفيليات أسماك الحمام في شمال غرب الخليج العربي، العراق

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تم جمع 600 عينة من الأسماك ما بين أيلول 2011 وآذار 2012، من المياه البحرية العراقية شمال غرب الخليج العربي. تنتمي هذه الأسماك إلى عشرة أنواع: *Alectis indica*، *armatus*، *C. bajad*، *C. malabaricus*، *Gnathanodon speciosus* و *Megalaspis cordyla*. أظهرت نتائج الفحص أن 107 نوعا من هذه الأسماك كانت مصابة بتسعة أنواع من الطفيليات، شملت هذه خمسة أنواع من الديدان الشريطية *Callitetrarhynchus gracilis*، *Callitetrarhynchus* sp.، *Floriceps minacanthus*، *Progrillotia* sp.، *Pseudogrillotia spratti*، ونوع واحد من يرقة الدودة الخيطية *Skrjabillanus* sp. وثلاثة أنواع من القشريات *Lernanthropus indicus*، *L. corniger* و *Caligus cordyla*. أظهرت نتائج الدراسة الحالية أن أعلى معدل لنسبة حدوث الإصابة كان بـأنواع الأسماك *M. cordyla* (93.7)٪ وأقلها بـ *C. malabaricus* (6.25)٪. كما بينت النتائج أن أعلى شدة إصابة كانت بالديدان الشريطية (4.65) وأقل شدة إصابة في الديدان الخيطية (1.00).