

Gyrodactylus Worms of Monogenea Parasitizing on Common Carp Fish in Salah-ALdeen Dam Lake – Lattakia – Syria

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Abstract — This study included 123 common carp fish, which were collected monthly and randomly from Salah-ALdeen Dam Lake (ALsafragia) during the period from July 2014 to June 2015.

Two parasitic species of genus *Gyrodactylus* were isolated and classified: *G. medius*, *G. elegans*.

Total Prevalence (%) of fish with *Gyrodactylus* was 25.20 %, the parasite *G. elegans* showed a wide spread compared to *G. medius* in common carp, where it was isolated in more numbers through nine months of the year with prevalence 13.82 %, and intensity 8.11 worm/fish.

The results showed that temperature is one of the most important abiotic environmental factors affecting the distribution and spread of external parasites *Gyrodactylus* sp. but in reverse, where it recorded the greatest appearance during the winter.

Keywords — Prevalence – Intensity – Monogenea – Common Carp – *Gyrodactylus* – Salah-ALdeen Dam Lake.

I. INTRODUCTION

Parasites are the deleterious factors in growth and other biological characteristics of fishes [1], [2]. The study of the parasitic fauna and its knowledge is so important to take measures for their control [3]. For this reason, studies are conducted everywhere in the world to gain basic knowledge on the parasitic fauna of fishes.

Monogenea are parasites of marine and freshwater fishes, that were first isolated and classified by Muller in 1776 from the skin of the halibut, *Hippoglossus hippoglossus* [4]. They also parasitize frogs and other aquatic animals throughout freshwater and marine habitats [5].

Three families of Monogenea including Gyrodactylidae, Dactylogyridae and Ancyrocephalidae are the most reported parasites found in cultured and wild fishes [5], [6]. Monogenea, are known to exhibit both host and organ specificity as some species prefer to colonize the skin and fins, while some are mostly restricted to gills of marine and freshwater fishes. The life cycle of Monogenea involves only one host, and they spread by releasing eggs and free-swimming infective larvae [5].

II. MATERIALS AND METHODS

A. Study Area

Samples of the common carp fish *Cyprinus carpio* L., were collected from Salah-ALdeen Dam Lake (ALsafragia) during the period from July 2014 to June 2015, for parasitological analysis.

B. Transportation of Fish Samples

Samples were stored in a labelled transparent plastic container with cover and transported alive immediately to the High Research Lab in Zoology Department, Faculty of Science, Tishreen University for examination and identification.

C. Parasitological Analysis

All fish were collected with gill nets. Samples were examined externally for pathological signs of Monogenea parasites. For each sample, the gills, skin, fins, mouth lumen and nose potholes were examined.

All biopsies tissues were examined under light microscopes. collection, fixation, identification and quantification of Monogenea parasites were done [7], [8] - [9].

The Monogenea parasites were classified based on taxonomic keys [10], [11] - [12].

Prevalence (%), intensity were calculated according to formula given by Upadhyay *et al.* as follows [13], [14]:

- Prevalence (%) = (No. of infected fish / Total No. of examined fish) x 100.
- Intensity = No. of collected parasites / No. of infected fish.

D. Environmental Parameters

Water quality parameters were measured including temperature, dissolved oxygen (DO₂) and pH by using the measuring device WTW - Multi 340i.

III. RESULTS AND DISCUSSION

The number of fish infected with these worms was 31 out of 123 studied fish of common carp, with a total prevalence 25.20 %, where the highest value 77.77 % was in winter with an average seasonal temperature 16 °C, while the lower value 2.32 % was in summer with an average seasonal temperature 26 °C.

C. The highest intensity was 9.78 worms/fish in winter, while the lower value was 4 worms/fish in summer Fig. 1.

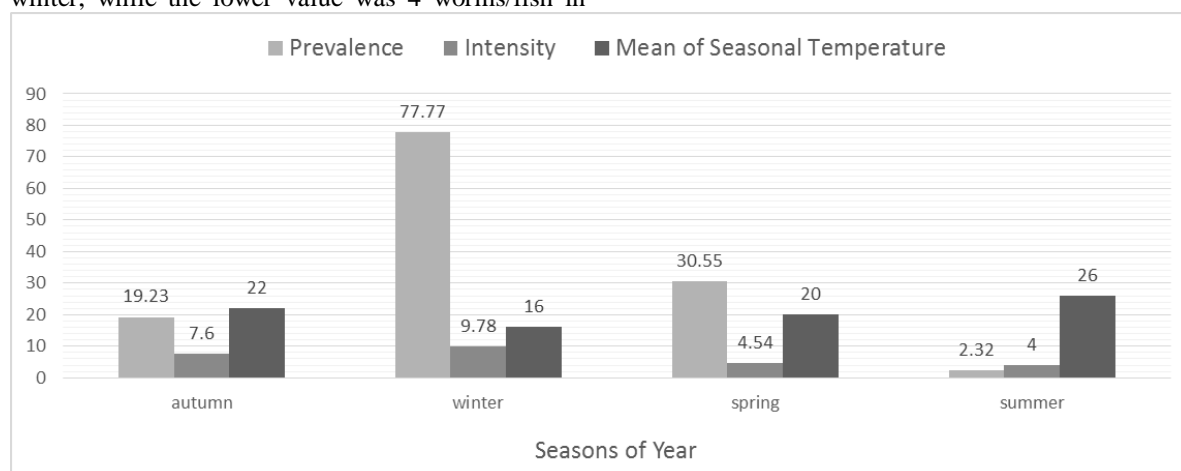


Fig 1: Prevalence (%) and intensity of Gyrodactylus worms in common carp fish through the seasons of year.

The study showed that 14 of the total fish studied were infected with *G. medius*, where it achieved an overall prevalence 11.38 %, this species appeared during six months of the year, while it was not recorded from May to October. The mean of prevalence \pm standard deviation was 15.69 % \pm 18.01, as for the highest prevalence 50 % was in February, where the temperature reached 17 °C, the concentration of dissolved oxygen 13.7 mg/l and pH 7.5, while the lower prevalence was 16.66 % during April, where the temperature reached 20 °C,

concentration of dissolved oxygen 10.2 mg/l and pH 7.7.

The number of isolated parasites of this specie was 91 with overall intensity 6.5 worms/fish. The mean of intensity \pm standard deviation was 3.19 \pm 3.70 during the year, where the highest value of intensity 9 was recorded in February, the same month in which the highest prevalence was also recorded, while the lower value of the intensity was 3.5 during April, it was also the same month in which the lowest prevalence was recorded, Table I.

TABLE I. Prevalence (%) and intensity of Gyrodactylus worms parasitizing on common carp fish according to environmental parameters.

Months	Environmental parameters			No. of examined fish	No. of infected fish	Prevalence (%)		Intensity	
	pH	DO ₂ mg/l	T °C			<i>G. elegans</i>	<i>G. medius</i>	<i>G. elegans</i>	<i>G. medius</i>
January	7.4	14.8	15	6	5	50	33.33	9.33	8.5
February	7.5	13.7	17	8	6	25	50	12.5	9
March	7.5	12.9	18	10	5	20	30	5	4.33
April	7.7	10.2	20	12	4	16.6	16.66	5.5	3.5
May	7.8	7.9	23	14	2	14.28	0	4.5	0
June	7.8	7	24	15	1	6.66	0	4	0
July	7.9	6	27	13	0	0	0	0	0
August	8.1	5.9	28	15	0	0	0	0	0
September	7.9	6.3	26	12	0	0	0	0	0
October	7.8	8	22	8	1	12.5	0	7	0
November	7.8	11	19	6	4	33.33	33.33	10.5	5
December	7.5	12.5	17	4	3	50	25	11.5	8
Total	-	-	-	123	31	-	-	-	-
Mean	-	-	-	-	-	19.03	15.69	5.82	3.19
± SD	-	-	-	-	-	± 17.76	± 18.01	± 4.47	± 3.70

Gyrodactylus is a cold-loving parasites with the highest of prevalence 77.77 % and intensity 9.78 worms/fish during the winter compared to other seasons, which was consistent with the study [15] where the highest prevalence 36.36 % was recorded during the winter in December with a temperature 15 °C, dissolved oxygen 15.09 mg/l, while the lower value 2.04 % was recorded during the summer in August with a temperature 29 °C, dissolved oxygen 5.07 mg/l. Our results also correspond to a study [16] that indicated the appearance of this genus in the summer was lower than the rest of the year.

The overall prevalence of *G. medius* in this study was 11.38% during February and a low value during April. In comparison to the study [15] the overall prevalence of the same specie was 18.33 % with a first peak 36.36 % in January with a temperature of 15 °C and the dissolved oxygen 15.09 mg/l, the second peak was during June and reached 33.33 % with a temperature 22 °C and dissolved oxygen 8.58 mg/l, while the lower value was recorded in August and reached 2.04 % with a temperature 29 °C and dissolved oxygen 5.7 mg/l, this difference may be due that these parasites resort in climatic inappropriate conditions to maintain their presence at least, and being productive and able to raise many embryos that may be up to thousands during several days [17].

As for *G. elegans*, our results are similar and consistent with the studies [17], [18] which indicated the appearance of this specie in large numbers at low temperatures where the degree was 12 °C is the best, while the prevalence and Intensity become to the lowest value with the rise of temperature to 20 °C.

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