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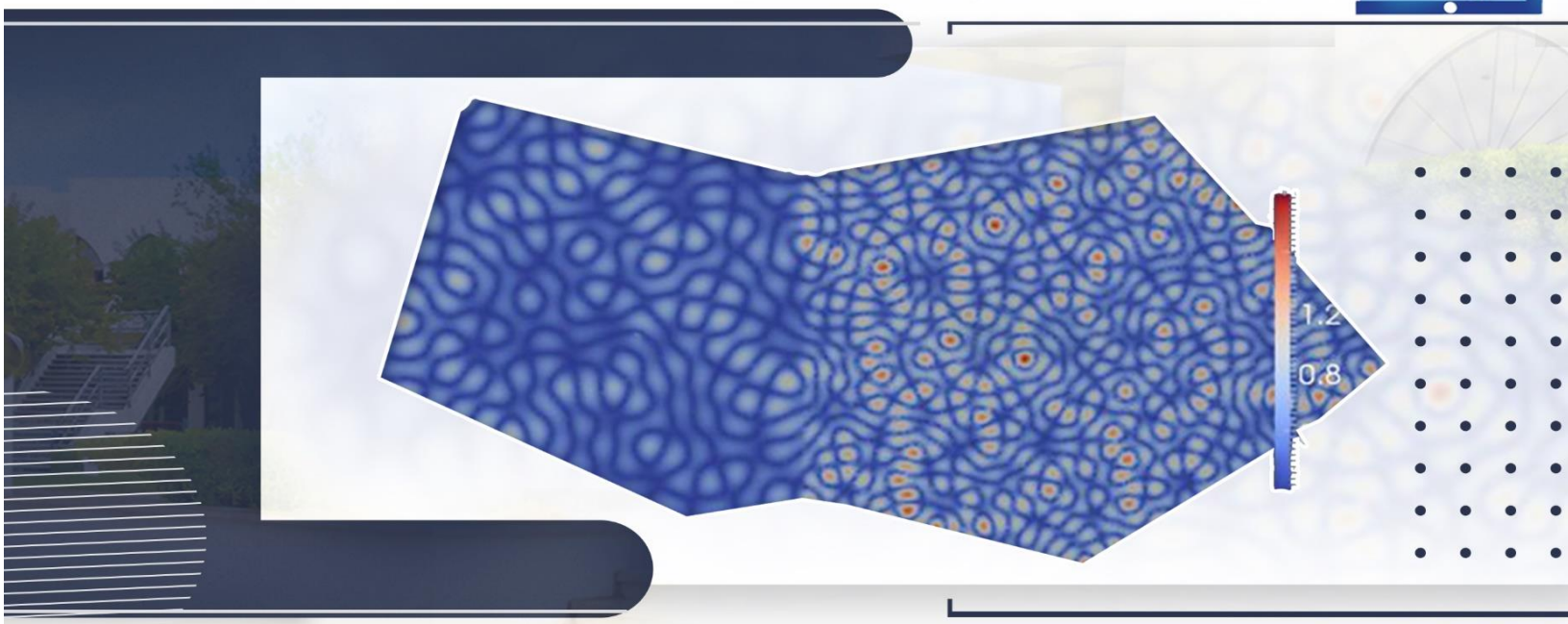

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Changes in some Hematological Parameters of Chelon Labrosus (Risso,1826) in Umm Hufayn - Eastern Libya During Different Seasons

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A B S T R A C T

This study aimed to investigate the effects of seasonal variation on some Hematological Parameters of *Chelon labrosus* (Risso, 1826) in Umm Hufayn lagoon - eastern Libya, Mediterranean coast, and surface water temperature and salinity. The results revealed that the surface water temperature recorded (11 ±1.73) 0C between December to February and (23±0.00)0C between June to August, salinity recorded (4.67±0.88)% between December to February and (23±1.15)% between June and August, on the other hand, seasonal variation affected hematological parameters whereas (WBCs) reached to high during the autumn season and recorded the lowest level during the summer, also (RBCs) reached to high during the autumn and the lowest levels during the spring. Furthermore, (HCT) reached high levels during the autumn and the lowest levels during the summer, otherwise recorded (MCV) at high levels during the spring and the lowest levels during the summer, and (MCH) reached high levels during the spring and lowest levels during the summer, while (MCHC) recorded the high levels during the winter and lowest levels during the autumn and finally (PLT) reached to high levels during the spring and lowest value during the autumn.

1 Introduction

Temperature plays an important role in various aspects of the life history, ecology, and physiology of ectotherms (Angilletta *et al*., 2002). Growth rates (Arnold and Peterson, 1989; Avery, 1994; Litzgus and Brooks, 1998a), reproduction (Schwarzkopf and Shine, 1991; Litzgus and Brooks, 1998b; Rock and Cree, 2003), seasonal activity patterns and habitat use (Webb and Shine, 1998; Whitaker and Shine, 2002), and geographic distribution (Castonguay *et al*., 1999) are all influenced by environmental temperatures, for example, variation in environment temperature can affect many reproduction and life history traits, including metabolism and different activity. The aim of this study examined the effect of seasonal variations on some hematological parameters of *Chelon Labrosus* (Risso,1826) in Umm Hufayn - Eastern Libya.

2 Materials and Methods

2.1 Study Area

Umm Hufayn is a relatively small lagoon located about 80 km east of Derna in the direction of Tobruk (Fig.1). It is connected to the open sea through a gate sized about 0.5 Km, through it seawater enters the lagoon on tide times. Underground springs at the inner side of the lagoon discharge water (Abd AL Hamid *et al*., 2017).

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Figure (1). Umm Hufayn lagoon Eastern Libya.

2.2 Characteristics of Surface Water of Um Hufain Iagoon

Temperature measurements (°C): In situ, water temperatures were measured by using an ordinary thermometer.

2.3 Salinity (S%):

Salinity was determined by measuring the electrical conductivity using an inductive Salinometer (Beckman; model RS-10).

Collection of fish and blood samples: A total of forty fish adults of *Chelon Labrosus* (Mugilidae) were collected during each season (autumn, winter, spring, and summer season) and blood was rapidly drawn from the caudal vessel or heart of each fish (figure 2&3) according to Hrubec *et al*., 1997 method and blood was taken sent to a medical laboratory for determination of some hematological parameters.

Figur.2. blood taking from cadual peduncle.

Figure (3). Blood taking from heart puncture.

Statistical Analysis

Data were presented as means ± standard error (SE). The statistical analysis was performed with multi-variant analysis of variance (ANOVA) using the SPSS (version 15) software package for Windows comparing the multi-variations between the groups. F-test was calculated and considered statistically significant at $p < 0.05$.

3 Results

Characteristics of Surface Water of Um Hufain lagoon (Mean±SE):

In Um Hufain lagoon surface water temperature ranged from (11 ±1.73) between December to February to (23 ±0.00)0C between June to august and salinity from (4.67±0.88) between December to February and (23± 1.15) % between June and August .

Table (1). Characteristics of surface water of Um Hufain lagoon (Mean±SE):

Season / Parameter	Summer (Jun.-Aug.)	Autumn (Sep.-Nov.)	Winter (Dec.-Feb.)	Spring (Mar. – May)
Temperature ^{0}C	23 (0)	18 (0)	11 (1.73)	14 (1.15)
Salinity %	23 (1.15)	12 (.58)	4.67 (.88)	9 (1.732)

Effect of Seasonal Variation on some Hematological Parameters: -

Parameters content in sampled were recorded in Table (2). The seasonal variation of WBC_S: - It can be seen that the highest WBC_S value (185.32±18.27) was estimated during autumn, while the lowest value (171.44± 6.12) was obtained during summer.

The Seasonal Variation of RBCs: -

The highest RBCs count (2.75± 0.25) was recorded during the autumn, and the lowest value (1.21± 0.41) was recorded during the spring season.

The Seasonal Variation of HGB: -

The highest value (11.17±0.51) was recorded during the autumn, moreover, the lowest value (5.86±1.56) was shown during the summer season.

The Seasonal Variation of HCT: -

The highest value (40.77±3.03) was recorded during the autumn, furthermore, the lowest value (19.96±6.04) was shown during the summer season.

The Seasonal Variation of MCV: -

The highest value (171.10±4.80) was recorded during the spring, and the lowest value (122.70±6.15) was shown during the summer season.

The Seasonal Variation of MCH: -

The highest value (36.04±1.57) was recorded during the winter, and the lowest value (27.65±1.41) was shown during the autumn season.

The Seasonal Variation of MCHC: -

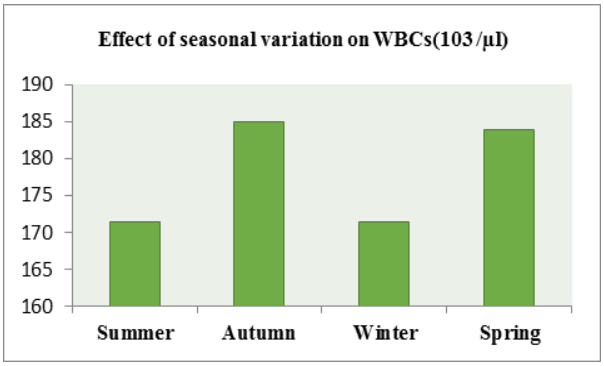
The highest value (36.04±1.57) was estimated during winter, one the other hand, the lowest value (27.65±1.41) was shown during the autumn season.

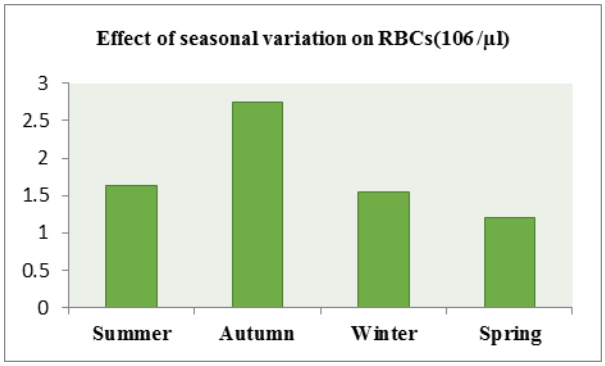
The Seasonal Variation of PLT: -

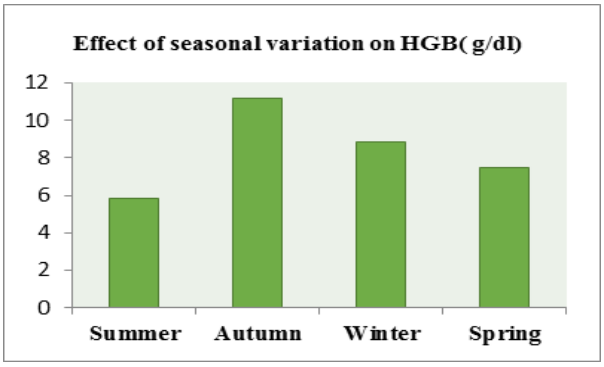
The highest value (283.00±276.00) was recorded during the spring, and the lowest value (20.25±3.09) was shown during the autumn season.

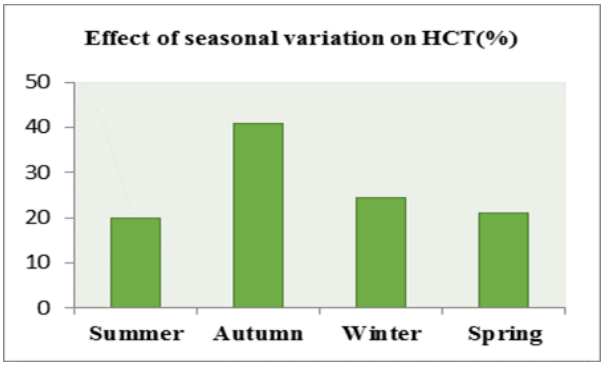
Table (2). Effect of seasonal variation on some on hematological parameters:

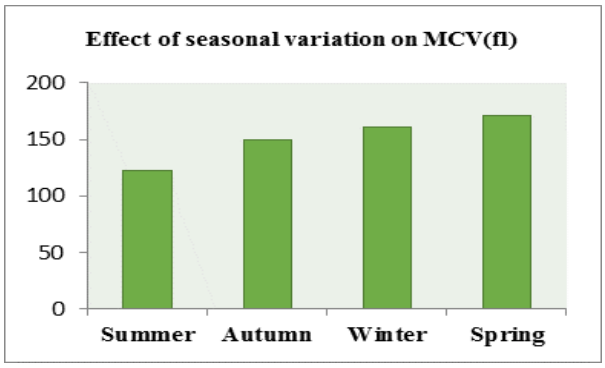
Parameters	Summer	Autumn	Winter	Spring
WBCs (103 /µl)	171.44± 6.12[a]	185.32± 18.27[a]	171.50± 13.85[a]	183.85± 32.85[a]
RBCs (106 /µl)	1.63± 0.45[ab]	2.75± 0.25[b]	1.55± 0.22[ab]	1.21± 0.41[a]
HGB (g/dl)	5.86±1.56[a]	11.17±0.51[b]	8.86±1.14[ab]	7.45±2.65[ab]
HCT (%)	19.96±6.04[a]	40.77±3.03[b]	24.52±2.80[a]	20.90±7.60[a]
MCV (fl)	122.70±6.15[a]	149.97±8.50[b]	160.64±4.85[b]	171.10±4.80[b]
MCH (Pg)	36.50±1.68[a]	41.70±4.20[a]	57.78±2.78[b]	61.15±1.15[b]
MCHC (g/dl)	29.98±1.84[a]	27.65±1.41[a]	36.04±1.57[b]	35.75±0.35[b]
PLT (103 /µl)	22.60±17.44[a]	20.25±3.09[a]	88.60±36.74[ab]	283.00±276.00[b]

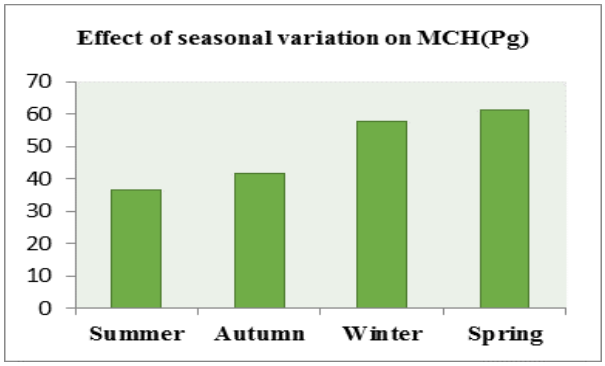


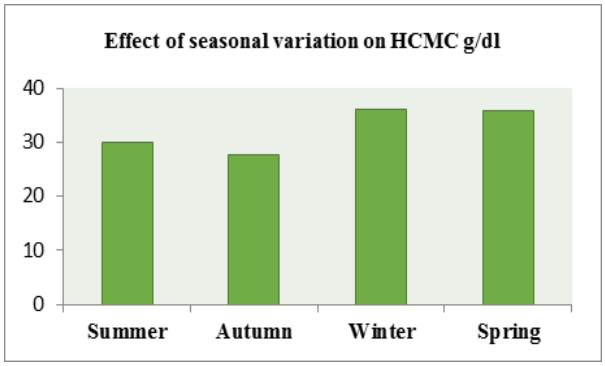


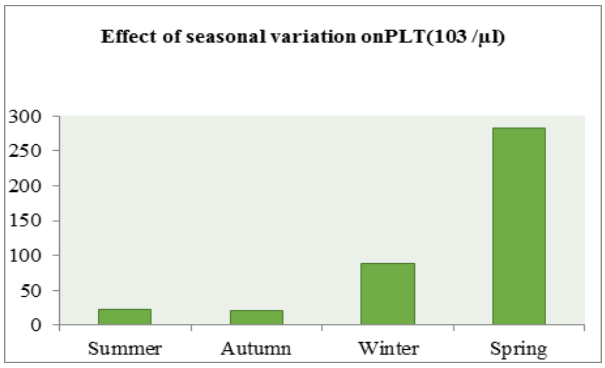












4 Discussion

Show significant variation in different seasons, especially between warm and cold seasons like water temperature, dissolved oxygen, turbidity, and electrical conductivity, and unlike Forghally *et al*., (1973 mentioned that the results showed that there is no significant difference in relation to gender except in hematocrit and WBCs of *Alburnoides eichwaldii*. it has a higher value in females. Forghally *et al*., (1973) Reported that the temperature of the aquatic environment is important for ensuring survival, distribution, and normal metabolism of fish, failure to adapt to temperature fluctuations is generally ascribed to the inability of fish to respond physiologically with resultant mortality, which is related to changes in the metabolic pathways.

Olaoluwa *et al.* (2015) was indicated to effect to a seasonal variation on some physiological parameters and mentioned that some live enzymes were increased during the autumn season.

Aboudbous *et al*. (2017) observed that there is a significant increase in liver enzymes in the autumn season compared to the other seasons in blue tuna in Misurata – Libya.

Bhat (2017) in his study on '*Schizothorax niger* found that the effects of the independent variables e.g., sex, weight, and length values were determined seasonally.

The analysis revealed that the highest number of leukocytes was found in spring and the lowest number was found in winter, hemoglobin and hematocrit values were highest during the months of summer and lowest during winter. It was also seen that males were having greater values for hemoglobin and hematocrit than females, whereas total leukocyte count in females was higher than in males. It was also found that there was a positive correlation between length/weight and hemoglobin and hematocrit values whereas a negative correlation between length or weight and total leukocyte counts.

Abdalhafid *et al*., (2021). Reported that, the levels of GOT and GPT of *Chelon Labrosus* were markedly increased during the autumn compared with the winter while ALP levels almost remained stable during four seasons.

Conflict of Interest: The authors declare that there are no conflicts of interest.

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