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PRELIMINARY REPORT ON THE WATER QUALITY, ICHTHYOFAUNA AND BIOMETRIC INDICES FOR PRUSSIAN CARP FROM IEZERUL MOSTIȘTEA LAKE, ROMANIA

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Abstract

*Summarizing so far personal observations dated April 2023 and knowledge among anglers concerning the ichthyofauna of Iezerul Mostiștea located in Călărași County, was established that this ecosystem host 18 edible species. This paper analyzes for the first-time weight-length relationships, Fulton's condition factor and the size structure for Prussian carp in relation to water quality from Mostiștea Lake. A positive allometric growth pattern was estimated for Carassius gibelio: $TW = 0.0148TL^{3.3097}$ (coefficient of determination $R^2 = 0.9803$), $TW = 0.0046SL^{3.4855}$ ($R^2 = 0.977$). The values for length ranged between 7.8 and 21.1 (average 11) cm for TL, 6 and 17.4 (average 8.77) cm for SL, while total weight varied from 5 to 174 (average 23.76) grams. Condition factor ranged between 1.05 and 1.86. Eustrongylides spp. and Philometroides sanguineus were also recorded. Water samples collected from three sampling points were subjected to physico-chemical characterization and based on results water was classified in quality classes. Total hardness values present very significant correlations with electrical conductivity (r=0.8814***) and pH (r=0.9183***). The determined parameters indicated that the water quality is optimal for the development of aquatic organisms.*

Keywords*: Carassius gibelio, fish species, Mostistea, water quality, weight-length relationship.*

INTRODUCTION

Iezerul Mostiștea is an artificial lake, part of a rich network of reservoirs with multiple functions, e.g., water supply, fishing ponds, irrigation, recreation, created in the Mostiștea hydrographic basin located in the Eastern Romanian Plain (Ghiță, 2008). In a technical paper regarding the inland fisheries of Europe, Dill (1993) mentioned "Mostiștea" from Călărași County among principal River lagoons from Romania.

Previous approaches of Mostiștea Valley have emphasized the importance of this micro-region in terms of archeological discoveries and cultural heritage (Covătaru et al., 2022), wetland for protected bird species (Tanislav, 2014) or mapping hydrogeomorphological hazard (Grecu et al., 2013).

Even though Mostiștea Lake was included in Natura 2000 site ROSPA0105 Valea Mostiștei (Mostiștei Valley), providing the framework for practicing water sports, fishing and wildlife observing (https://ceddu.ro/), few data have been published about its ichthyofauna until now. Thus, in an integrated diagnostic study of the socio-economic development potential of the Dorobanțu commune in Călărași County (2015), it is mentioned that there are numerous fish farms on the Mostiștea reservoirs, including common carp *Cyprinus carpio* and Prussian carp *Carrasius auratus gibelio* (https://primariadorobantu.ro/).

Most available information regarding the names of the bony fish species inhabiting Iezerul Mostiștea comes from Romanian fishing forums or websites that promote tourist attractions and accommodation, which suggest the presence of bleak, common carp, rudd, roach, Prussian carp, Silver carp (https://www.desprepescuit.ro/), freshwater bream, sichel, Wels catfish, Northern pike,

pike-perch, European perch, gobies (https://www.pescuitul.ro/), tench and Crucian carp (https://www.infopensiuni.ro/). As for European bitterling *Rhodeus sericeus amarus*, this fish was mentioned for Iezerul Mostiștea fauna between April 2018 and March 2019 in a final report about the inventory and mapping the species and habitats from ROSCI0131 Oltenița-Mostiștea-Chiciu (https://www.natura2000oltenita-chiciu.ro/wp-content/uploads/).

Weight-length relationships (WLRs) and Fulton's condition factor (K) are essential tools to provide the growth pattern of fishes and interactions between biotic and abiotic environmental factors in fishery research (Jin et al., 2015; Stavrescu-Bedivan et al., 2016; Stavrescu-Bedivan et al., 2018; Khan et al., 2020).

Previous studies have highlighted before the importance of monitoring the physico-chemical parameters of the water (Scăeţeanu et al., 2012; Stavrescu-Bedivan et al., 2022) and length frequency distribution within of a fish population (Stavrescu-Bedivan et al., 2016), to evaluate the ecosystem health.

The present report aims to update the inventory of ichthtyofauna and to provide first data on some biometric features of *Carassius gibelio* in relation to water quality parameters of Iezerul Mostiștea from Mostistea Valley, an important tourist attraction and fishery resource from Romanian Plain.

In the case of collected water samples were determined the following physico-chemical parameters: turbidity (**T**), **pH**, electrical conductivity (**EC**), chloride (**Cl^-**), total hardness (**TH**), dissolved oxygen (**DO**), chemical oxygen demand (**COD**), biochemical oxygen demand (**BOD**), phosphate-phosphorus (**$P\text{-}PO_4^{3-}$**) nitrate-nitrogen (**$N\text{-}NO_3^-$**), nitrite-nitrogen (**$N\text{-}NO_2^-$**), ammonium nitrogen (**$N\text{-}NH_4^+$**). Based on the results and according to Order 161/2006 water was classified in quality classes.

MATERIALS AND METHODS

Study area

Iezerul Mostiștea (Figure 1), also known as Ezerul Mostiștea (Moștiștei) is placed in Călărași County, Romania (44°15'0" N, 26°54'0" E) (https://www.mindat.org/; https://ro.getamap.net/).

Located on the lower course of the Mostiștea River, it is a fluviatile liman mainly used for fish farming and irrigation, where sport fishing can be practiced all year round (https://www.skytrip.ro/). Iezerul Mostiștea is considered the largest water accumulation in Bărăgan with an area of 1860 ha. The increase in water level by raising the dikes led to the reduction of the surface of the reeds and other swamp plants that emerged around this lake (https://primariadorobantu.ro/).

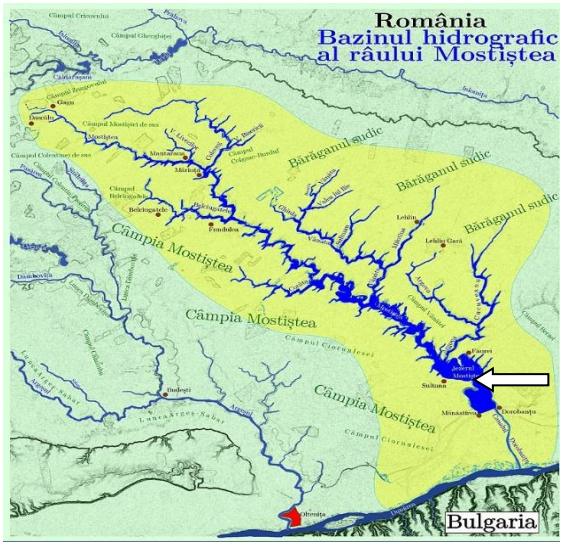

Figure 1. Iezerul Mostiștea (arrow) in the hydrographic basin of Mostiștea River (https://commons.wikimedia.org/wiki/)

Fish inventory, collection and measurements

An inventory of fish species living in Iezerul Mostiștea was performed using data provided by grey literature (fishing websites, reports on mapping the species and habitats from Natura 2000 sites, brochures about biodiversity conservation management planning) and personal catches dated April 2023. In Results and Discussions section (Table 2) is presented scientific classification according to FishBase (Froese & Pauly, 2023) of each fish species with both English and Romanian common names.

Some fish species were collected from Mostiștea Lake in the spring of 2023 (Figure 2), outside the prohibition season, using fishing rods and nets.

Considering Directive 2010/63/EU (2010) and recommendations of AVMA (2020) concerning ethical issues regarding fish welfare, as quickly

as possible after collection the fishes were subjected to rapid cooling, then sorted, labeled, and transported to the laboratory (Figure 3), in order to record the biometric characteristics and investigate for the presence of parasites under a Krüss Optronic stereomicroscope.

Figure 2. Aspects of Mostiștea Lake (April 2023)

Figure 3. Fish samples from Mostiștea Lake in laboratory

A total of 101 fish individuals belonging to nine teleost fish species (Table 3) were measured for total length (TL ± 0.1 cm), standard length (SL ± 0.1 cm) and weighted to the nearest 0.01 g total body weight (TW) with a A PS 2100.R2.M precision balance.

The weight-length relationships were calculated as $TW=aTL^b$ and $TW=aSL^b$, where intercept *a* describes the rate of change of weight with length of fish and slope *b* gives information about the type of growth (Froese, 2006). The relationships between the weight and the length were also expressed through linear regression (Log W= Log a + b Log L) (Stavrescu-Bedivan et al., 2018; Stavrescu-Bedivan et al., 2022).

A positive allometric pattern of growth is suggested when b > 3, while b < 3 indicates a negative allometric or hypoallometric growth type (Karachle & Stergiou, 2012).

The Fulton's condition factor (K) was calculated as $K= (TW/TL^3)*100$ to assess the well-being of fishes in their habitat (Nehemia et al., 2012; Stavrescu-Bedivan et al., 2018; Khan et al., 2020).

Size frequency distribution of fish is another important parameter, therefore size intervals for total length and total weight distribution of fish samples were established (Innal, 2012; Stavrescu-Bedivan et al., 2015).

Water sampling and analyses

Water samples were collected from three different points (**SP**) (Figure 4), as it follows:

(**SP1**) 44°13'26.2"N, 26°55'59.1"E 6WFM+H6G Dorobanțu;

(**SP2**) 44°13'07.7"N, 26°55'14.7"E 6W9C+G7H Mânăstirea;

(**SP3**) 44°12'51.6"N, 26°54'28.4"E 6W75+P5J Mânăstirea.

Figure 4. Water sampling points from Mostiștea Lake (map source: Google Earth)

Sampling campaign was conducted in April 2023 and samples were collected by manual grab from 0.5 m depth in polyethylene bottles

that were labelled and transported in a cold box (4°C) in laboratory. All samples were allowed to stay until they reached room temperature before analysis which was performed in triplicates. The analyses were conducted as previously reported (Stavrescu et al., 2015) by using methods like those recommended for drinking water (Mănescu et al., 1994) and briefly listed in Table 1.

Table 1. Performed analyses, analytical techniques and instrumentation

Analysis	Analytical technique	Instrumentation
Turbidity (**T**)	Nephelometric	HI-88703-02 Turbidity Meter
pH	Potentiometry	InolabWTW pH-meter
Electrical conductivity (**EC**)	Conductometry	Hach SensIon7
Chloride ($\mathbf{Cl^-}$)	Volumetry (Mohr's procedure)	Digital burette
Total hardness (**TH**)	Complexometric titration	-
Dissolved oxygen (**DO**)	Potentiometry	HI98193 - Portable Dissolved Oxygen Meter and BOD Meter
Chemical oxygen demand (**COD**)	Manganometry	-
Biochemical oxygen demand (**BOD**)	Manometric	BOD Sensor + BOD Incubator
Phosphate phosphorus ($\mathbf{P\text{-}PO_4^{3-}}$)	Spectrophotometry	MetertekSP830 Plus spectrophotometer
Nitrite nitrogen ($\mathbf{N\text{-}NO_2^-}$)		
Nitrate nitrogen ($\mathbf{N\text{-}NO_3^-}$)		
Ammonium nitrogen ($\mathbf{N\text{-}NH_4^+}$)		

RESULTS AND DISCUSSIONS

1. Ichthyofauna composition of Mostiștea Pond

Overall, a list comprising 18 fish species was compiled for the ichthyofauna of Iezerul Mostiștea Lake located in Călărași County (Table 2). Of these, nine fish species were identified in the fish sampled in April 2023 and their biometric measurements are shown in Table 3.

Seven species were encountered both in literature survey and present report, namely: *Carassius gibelio* and *Cyprinus carpio* (Order Cypriniformes, Family Cyprinidae); *Abramis brama*, *Rutilus rutilus* and *Alburnus alburnus* (Order Cypriniformes, Family Leuciscidae) (Figure 5 a-c); *Perca fluviatlis* and *Sander lucioperca* (Order Perciformes, Family Percidae).

Gymnocephalus cernua (Perciformes: Percidae) and *C. carpio* var. *specularis* (Cypriniformes: Cyprinidae) were mentioned for the first time in the present report for the ichthyofauna of Mostiștea Lake (Figure 5 d, e).

Figure 5. Some fish species caught from Mostiștea Lake: **a.** *Abramis brama*; **b.** *Rutilus rutilus*; **c.** *Alburnus alburnus*; **d.** *Gymnocephalus cernua*; **e.** *Cyprinus carpio* var. *specularis*

2. Prussian carp sample and biometric analysis

The biometric data for *Carassius gibelio* (N=50, unsexed) were registered as follows: TL (min. 7.8 - max. 21.1 cm, with an average of 11 cm); SL (min. 6 – max.17.4 cm, with a mean of 8.77 cm); TW (min. 5 – max. 174 g, with average of 23.76 g).

The weight-length relationships (Figure 6) were calculated as:

$\text{Log(TW)} = 3.4855\text{Log(TL)}-2.3391$ (r^2= 0.9803, 95% confidence intervals for the intercept and the slope); $\text{TW}=0.0046\text{TL}^{3.4855}$; $\text{Log(TW)} = 3.3097\text{Log(SL)}-1.8298$ (r^2= 0.977,

95% confidence intervals for the intercept and the slope); $TW = 0.0148SL^{3.3097}$.

The values for slope were within the expected range of 2.5-3.5 for all *C. gibelio* analyzed individuals. Since $b > 3$, the growth type for Prussian carp sampled in April 2023 was estimated as positive allometric, which means that fish grows faster in weight than in length (Karachle & Stergiou, 2012).

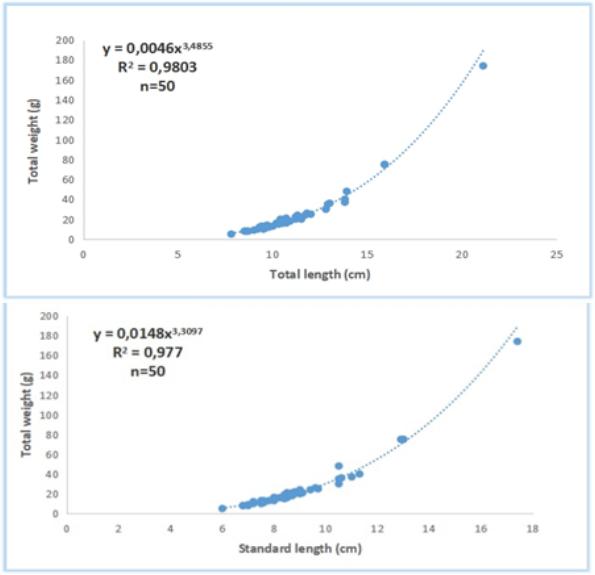

Figure 6. WLRs of *C. gibelio* in Mostiștea Lake (April 2023)

With values higher than 1 (min. 1.05 - max. 1.86, average 1.46), Fulton's condition factor K indicates favorable growth conditions (Şimşek & Kale, 2022) for Prussian carp in Iezerul Mostiștea.

As previous research mentioned, the fish condition and parameters of length-weight relationship in fish could be influenced by various factors such as sample size, size of captured specimens, sexual maturity age, food, environmental conditions, or sampling methods (Stavrescu-Bedivan et al., 2016; Famoofo & Abdul, 2020).

More biologically relevant than age was considered the determining the length of the fish (Rosli and Isa, 2012; Stavrescu-Bedivan et al., 2016; Stavrescu-Bedivan et al., 2022). According to FishBase, the common total length for *C. gibelio* is 20 cm (Kottelat & Freyhof, 2007).

In April 2023, the TL value of most (82%) Prussian carp individuals collected in Mostiștea Lake ranged between 7.8 and 12 cm, while 84 % of *C. gibelio* registered values of TW ranging between 5 and 30 grams (Figure 7).

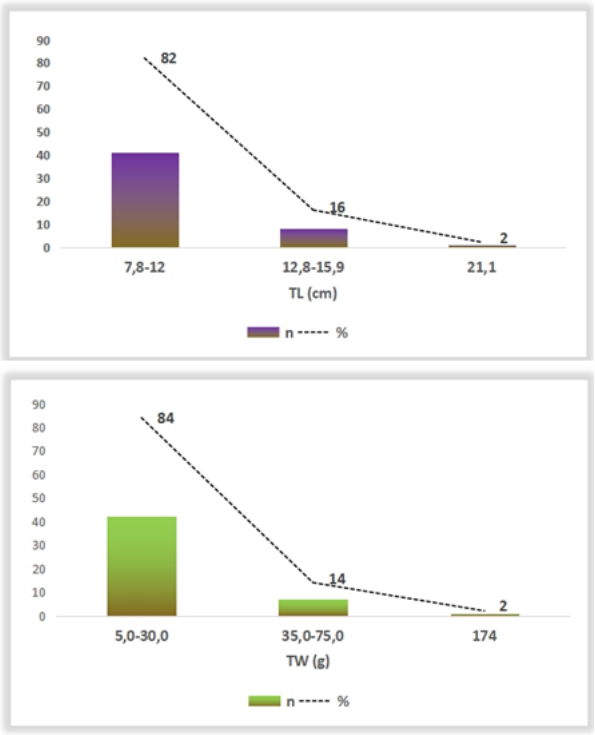

Figure 7. Length and weight distribution among size groups of *C. gibelio* (Mostiștea Lake, April 2023)

3. Parasites recorded in fishes from Mostiștea Lake

Following the parasitological examination of fish species sampled in Mostiștea Lake in April 2023, the parasites *Eustrongylides* spp. (Nematoda: Dioctophymatidae) and *Philometroides sanguineus* (Nematoda: Philometridae) were collected from the perch and Prussian carp, respectively.

Thus, infection with *Eustrongylides* spp. was noticed analyzing the external surface and internal organs of both individuals of *Perca fluviatilis* sampled among the fishes from Mostiștea Lake: 98 parasites removed from one perch (TL=17.5 cm; TW= 77.3 g) and 28 parasites removed from the second perch (TL= 18 cm; TW= 80 g) (Figure 8 a, b).

Figure 8. *Eustrongylides* spp. in *Perca fluviatlis* (**a, b**) and *Philometroides sanguineus* (**c-e**) in *Carassius gibelio* from Mostiștea Lake

As for *Philometroides sanguineus*, female of this nematode species was identified in the caudal fins of each of the four *Carassius gibelio* parazited individuals in the fish sample (TL ranging from 10.2 to 21.1 cm; SL ranging from 8 to 17.4 cm; TW ranging from 16 to 174 grams) (Figure 8 c-e).

In Romania, the nematode *Philometroides sanguineus* was registered before in the caudal fin of *Carassius gibelio* individuals (Cojocaru, 2010; Stavrescu-Bedivan & Vasile Scăețeanu, 2020; Stavrescu-Bedivan et al., 2021).

Table 2. Ichthyofauna of Mostiștea Lake
(☑ = encountered; n/a = data not available; C. name = common name; Ro.c.name= Romanian common name)

Fish species and classification	C. name	Ro. c. name	Literature survey	Present report
Abramis brama (Linnaeus, 1758) (Cypriniformes: Leuciscidae)	Freshwater bream	plătică	☑	☑
Alburnus alburnus (Linnaeus, 1758) (Cypriniformes: Leuciscidae)	Bleak	oblete	☑	☑
Carassius carassius (Linnaeus, 1758) (Cypriniformes: Cyprinidae)	Crucian carp	caracudă	☑	n/a
Carassius gibelio (Bloch, 1782) (Cypriniformes: Cyprinidae)	Prussian carp	caras	☑	☑
Cyprinus carpio Linnaeus, 1758 (Cypriniformes: Cyprinidae)	Common carp	crap	☑	☑
Cyprinus carpio var. specularis Lacepède, 1803 (Cypriniformes: Cyprinidae)	Mirror carp	crap oglindă	n/a	☑
Esox lucius Linnaeus 1758 (Esociformes: Esocidae)	Northern pike	știucă	☑	n/a
Gymnocephalus cernua (Linnaeus, 1758) (Perciformes: Percidae)	Ruffe	ghiborț	n/a	☑
Hypophthalmichthys molitrix (Valenciennes, 1844) (Cypriniformes: Xenocyprididae)	Silver carp	fitofag	☑	n/a
Pelecus cultratus (Linnaeus, 1758) (Cypriniformes: Leuciscidae)	Sichel	sabiță	☑	n/a
Perca fluviatilis Linnaeus, 1758 (Perciformes: Percidae)	European perch	biban	☑	☑
Rhodeus sericeus amarus (Bloch, 1782) (Cypriniformes: Acheilognathidae)	European bitterling	boarță	☑	n/a
Rutilus rutilus (Linnaeus, 1758) (Cypriniformes: Leuciscidae)	Roach	babușcă	☑	☑
Sander lucioperca (Linnaeus, 1758) (Perciformes: Percidae)	Pike-perch	șalău	☑	☑
Scardinius erythrophthalmus (Linnaeus, 1758) (Cypriniformes: Leuciscidae)	Rudd	roșioară	☑	n/a
Silurus glanis Linnaeus, 1758 (Siluriformes: Siluridae)	Wels catfish	somn	☑	n/a
Tinca tinca Linnaeus, 1758 (Cypriniformes: Tincidae)	Tench	lin	☑	n/a
n/a (Gobiiformes: Gobiidae)	goby	guvid	☑	n/a

Table 3. Fish species caught in Mostiștea Lake in April 2023 (C. name = common name; Ro.c.name= Romanian common name; n = number of individuals; TL and SL = total and standard length, in cm; TW = total weight, in grams)

Fish species	C. name	Ro. c. name	n	TL (min.-max.)	TL average	SL (min.-max.)	SL average	TW (min.-max.)	TW average
Sander lucioperca (Linnaeus, 1758)	Pike-perch	șalău	1	48.3	-	-	-	1094	-
Cyprinus carpio var. *specularis* Lacepède, 1803	Mirror carp	crap oglindă	1	13	-	-	-	27	-
Alburnus alburnus (Linnaeus, 1758)	Bleak	oblete	2	15.7-16.9	16.3	12.5-13.8	13.5	34-37	35.5
Perca fluviatilis Linnaeus, 1758	European perch	biban	2	17.5-18	17.75	15.2-15.3	15.25	77.3-80	78.65
Gymnocephalus cernua (Linnaeus, 1758)	Ruffe	ghiborț	4	10.4-12	11.35	8.4-10	9.4	14-21	18.75
Rutilus rutilus (Linnaeus, 1758)	Roach	babușcă	12	13.5-16.7	14.72	10.7-13.3	11.7	25-54	32.42
Abramis brama (Linnaeus, 1758)	Freshwater bream	plătică	13	9.9-32.3	27.09	7.5-27	22.42	8-414	314.46
Cyprinus carpio Linnaeus, 1758	Common carp	crap	16	8.5-23.6	14.44	6.8-19.5	11.87	10-182	51.12
Carassius gibelio (Bloch, 1782)	Prussian carp	caras	50	7.8-21.1	11	6-17.4	8.77	5-174	23.76

4. Water quality analyses

The obtained data resulted from analyses were grouped into three categories: physico-chemical parameters (Table 4), oxygen regime data (Table 5) and nutrient levels (Table 6) and the significance of them is presented in sections below.

Table 4. Values of physico-chemical parameters for water samples collected from Mostiștea Lake

Sampling point	T	Cl^-	pH	EC	TH
	NTU	mg/L		µS/cm	mg CaO/L
SP1	11.30	30.80	8.32	1134.67	17.62
SP2	11.70	28.50	8.62	1240.67	19.07
SP3	12.80	24.90	8.56	1242	18.74
Average±SD	**11.93±0.776**	**28.06±2.973**	**8.50±0.158**	**1205.78±61.58**	**18.48±0.760**
Limits/Quality classes*	NA	II	6.50-8.50	NA	NA

SD = standard deviation; *according to Order 161/2006 for the approval of the Normative concerning the classification of surface water quality to establish the ecological status of water bodies; **NA** = not available.

Table 5. Results concerning oxygen regime for water samples collected from Mostiștea Lake

Sampling point	DO	COD	BOD
	mg O_2/L		
SP1	8.30	15.43	4.20
SP2	8.27	15.59	4.51
SP3	8.62	15.43	3.91
Average±SD	**8.39±0.193**	**15.48±0.092**	**4.20±0.300**
Limits/Quality classes*	II	III	II

SD = standard deviation; *according to Order 161/2006 for the approval of the Normative concerning the classification of surface water quality to establish the ecological status of water bodies.

Table 6. Results concerning nutrient levels for water samples collected from Mostiștea Lake

Sampling point	$P\text{-}PO_4^{3-}$,	$N\text{-}NO_2^-$	$N\text{-}NO_3^-$	$N\text{-}NH_4^+$
	mg P/L	mg N/L		
SP1	BDL	BDL	BDL	BDL
SP2	BDL	BDL	BDL	BDL
SP3	BDL	BDL	BDL	BDL
Limits/Quality classes*	I	I	I	I

*According to Order 161/2006 for the approval of the Normative concerning the classification of surface water quality to establish the ecological status of water bodies; **BDL** = below detection limit of the used method for quantification.

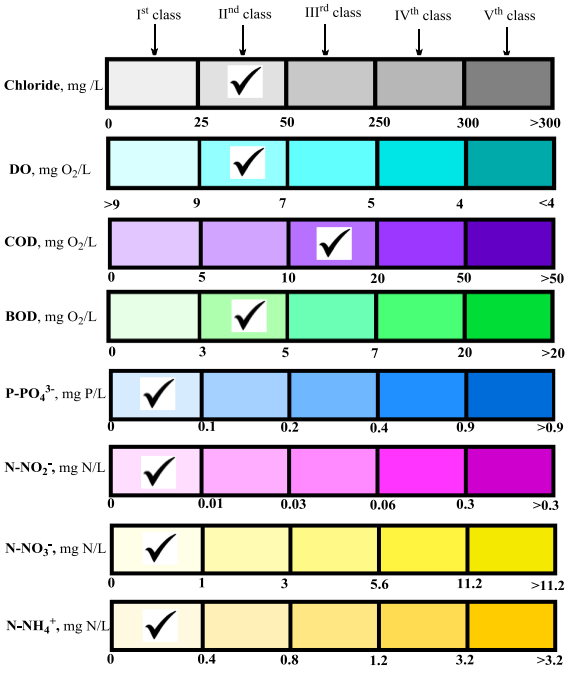

Figure 9. Quality classes for surface water according to legislation and assigned quality classes for water from Mostiștea Lake

a) Results concerning turbidity and chloride

Turbidity is associated with cloudiness of water, and it is determined by the presence of suspended matter (clay, mud, algae, silica, microorganisms) (Jagaba et al., 2020). Beside decrease of aesthetic quality of lakes, high turbidity levels are associated with negative effects on aquatic organisms the more so as decrease the water oxygen levels.

Water samples collected from Mostiștea Lake present turbidity slightly higher than 10 NTU (11.93 NTU, as average) (Table 4) much lower than values identified for Moara Domnească pond (58.43 NTU) (Sandu et al., 2023) but higher than those reported for Cuteţchi lake (5.06 NTU) (Catianis et al., 2018).

According to literature (DataStream Initiative, 2021), turbidity values below 10 NTU are considered low, 50 NTU correspond to moderately turbid water and values over 100 NTU are associated with very high turbidity (DataStream Initiative, 2021).

Chloride levels in water samples from Mostiștea allow to frame the water in IInd quality class (Figure 9) with an average of 28.06 mg/L (Table 4). According to some authors (Dugan et al., 2017) the presence of chloride in lakes is benign, levels higher of 100 mg/L posing ecological impact. Similar values as those determined in this study were reported for Mogoşoaia and Pantelimon lakes (Ionescu et al., 2015).

b) Results concerning pH, EC, TH and correlations between them

The **pH** values of all samples are at the upper limit of the interval imposed by legislation for surface waters (Order 161/2006) (Table 4), with an average of 8.50. As it is presented in the literature, **pH** is an important parameter for aquatic organisms and its' monitoring is recommended for aquaculture systems the more so as extreme values affect fish life and

productivity. Therefore, some authors (Stone & Thomforde, 2004) state that pH values below 6.50 reduce fish reproduction and newly hatched fish are affected by pH values above 9.00 to 9.50. Generally, an optimum range for fish is between 6.50-9.00, values above 9.00 being responsible of conversion of ammonium ion into ammonia, toxic chemical specie for fish (https://www.epa.gov/caddis-vol2/ph). pH values for water collected from different ponds and lakes located in Bucharest and vicinity are reported in several studies (Ionescu et al., 2015; Scăețeanu Vasile et al., 2020; Mihai C. et al., 2022).

EC is a measure of water ability to conduct electricity and is related with concentration of dissolved ions in the analysed sample. According to literature (Austin et al., 2016), desirable range for most fish species is 60-2000 µS/cm but some aquaculture species (channel catfish) can live in water with EC as high as 30000 µS/cm. Concerning this parameter, the analyses indicated close values for each sampling points, with an average of 1205.78 µS/cm, higher than those reported for different fishing ponds (Stavrescu-Bedivan et al., 2015; Scăețeanu Vasile et al., 2019; Stavrescu-Bedivan et al., 2021).

Ions responsible of **TH** level are calcium and magnesium and with a small contribution other divalent ion that usually are encountered in insignificant amounts. Different fish species have various hardness requirements, but desirable range is between 28-84 mg CaO/L, meanwhile acceptable range is above 5.6 mg CaO/L (Stone & Thomforde, 2004). In addition, calcium and magnesium are important for fish biological processes and are absorbed directly from water (Wurts & Durborow, 1992).

The average **TH** value (18.48 mg CaO/L) for analyzed samples corresponds to very soft water (Adey & Loveland, 2007).

Between **EC** (µS/cm) and **TH** (mg CaO/L) and between **pH** and **TH** (mg CaO/L) values were evidenced very significant correlations with correlation coefficient r=0.8814*** and r=0.9183***, respectively (Figure 10).

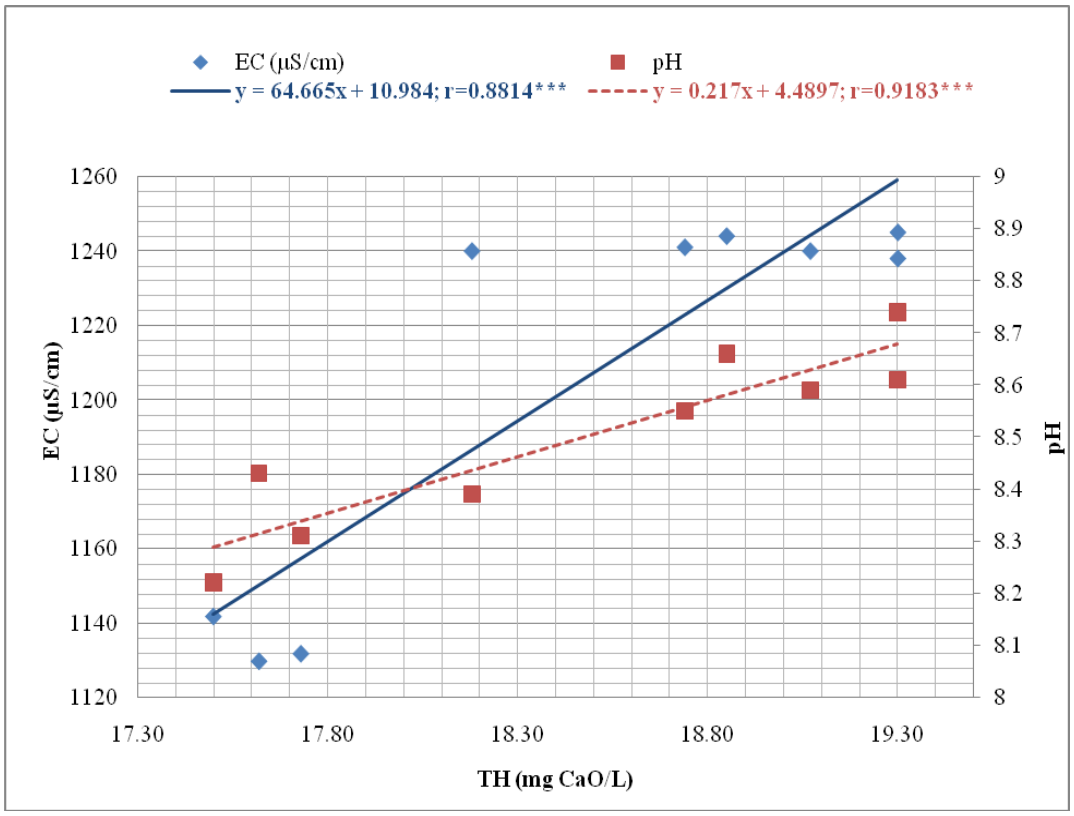

Figure 10. Correlations between conductivity and pH values with TH of water samples from Mostiștea Lake

c) Results concerning oxygen regime

Amount of oxygen dissolved in water that is available for aquatic life is represented by dissolved oxygen (**DO**). Generally, it is produced during photosynthesis of aquatic plants and algae. Related to fish requirements

there are data that sustain that warm water fishes need at least 5 mg O_2/L in comparison with cold water fishes which require 6-7 mg O_2/L (Hudson, 1998). In addition, values lower than 3-4 mg O_2/L favour anaerobic bacteria activity which will generate methane and hydrogen sulphide (Sallenave, 2012). Also, low levels are associated with hot cloudy weather, algae die-offs (Francis-Floyd, 2003).

As concerning our study, the analyses indicated an average value of 8.39 mg O_2/L for **DO (**Table 5**)** this suggesting IInd quality class according to Order 161/2006 (Figure 9). Average values for **DO** of 8.87 mg O_2/L was reported by Dunea et al. (2020) for Ialomița River Basin.

BOD and **COD** parameters indicate the level of contamination of water. **BOD** is the amount of dissolved oxygen needed for microorganisms to decompose organic matter. In contrast, **COD** is the given by the amount of oxygen used to chemical break down the organic molecules from water. **COD** is usually high in contrast with **BOD**.

Based on the obtained results for **COD** (15.48 mg O_2/L, as average) and **BOD** (4.20 mg O_2/L, as average) (Table 5) it could be assumed that water corresponds to IIIrd and IInd quality classes, respectively (Figure 9).

Related to **COD**, already published data indicate that water from Comana pond is framed in IIIrd quality class, also (Stavrescu-Bedivan et al., 2021). Similar values **BOD** was reported by Ionescu et al (2015) for Ialomița River Basin, Mogoșoaia, Herăstrău and Pantelimon lakes.

d) Results concerning nutrient species

Phosphorus and nitrogen species are encountered naturally in water but due to human activities as use of fertilizers, runoff from use of detergents and animal wastes or unproper wastewater management these species have risen unwanted levels. Among negative effects, it could be mentioned eutrophication that generates algal growth, large daily fluctuation of dissolved oxygen, poor water clarity, unpleasant odours.

For water samples collected from Mostiștea Lake, it has been found that nitrogen species (nitrate, nitrite, ammonium) and phosphorus (as phosphate) are below detection limit of the used method for quantification (spectrophotocolorimetry) (Table 6). These results allowed us to assign Ist quality class to analysed water (Figure 9). In contrast with this result, for Moara Domnească pond, it has been reported (Sandu et al., 2023) high levels of nutrient species based on which water was categorized in the Vth quality class.

CONCLUSIONS

On the one hand, this research reported novel information on fish species and on size frequency distribution, condition factor and parameters of weight-length relationship in *Carassius gibelio* inhabiting Iezerul Mostiștea, an important water resource from Romanian Plain, located in Călărași County. On the other hand, the adaptation of Prussian carps in their environment was assessed in relation to physico-chemical analysis of water samples.

The Ruffe *Gymnocephalus cernua* and Mirror carp *Cyprinus carpio* var. *specularis* are new records for the ichthyofauna of the studied ecosystem.

Fulton' condition factor K factor revealed the well-being of Prussian carps in the ecosystem, with values greater than 1.

The results obtained by physico-chemical analyses were used to frame the water to quality classes according to standards imposed by Order 161/2006. Hence, based on nutrient species levels water is classified as Ist quality class. Chloride, **DO** and **BOD** values sustain association with IInd quality class, meanwhile COD values indicate IIIrd quality class. **TH** values present very significant correlation with **EC** (r=0.8814***) and with **pH** (r=0.9183***), respectively. Based on the obtained results and analysis with literature data it could be assumed that water from Mostiștea Lake meets the requirements for optimal development of aquatic organisms. This study evidenced that maintaining water parameters within acceptable specific limits of species worth primary consideration and it is important for fish life.

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