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TROPHICITY OF LACUSTRINE WATERS (LACUSTRINE WETLANDS) ON THE ROMANIAN TERRITORY

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Abstract

The lakes over the territory of Romania are relatively uniformly distributed in the majority of the physico-geographical regions. A low density is specific to the west, where significant draining works have been done, and the highest density is characteristic to the north-east, with numerous ponds, registered since 14-15th centuries. Most of the lakes on the Romanian territory, especially those analysed in the present study, are human made. Most of the natural lakes are small and they do not have a special ecologic or economic importance. The analysed lakes, although situated in different physico-geographical conditions, are included, in most cases, in the category of good waters from a qualitative point of view, and eutrophic, mesotrophic and hipertrophic, from a trophic point of view. As a result of the fact that most lakes are human made, it is obvious that they are maintained artificially at this stage. Most of the mountain lakes, or those in the volcanic areas, are ultra-oligotrophic and oligotrophic.
Keywords: lakes, geographic distribution, genetic type, water quality, pollution.

1. Introduction

In the present study all the great natural lakes and most of the artificial lakes from almost all river basins have been analysed. We wanted to emphasize, for each region, river basin and aquatic surface, the quality of the lacustrine waters in order to use them in different fields of activity as well as a life support for the biologic component.

The major difficulty, for such a study, was represented by the relatively big dimension of the surface of Romania, the relatively great number of lakes (136), and the extremely varied and fragmented landforms. Some lakes are situated in hardly

accessible places, and as a result, the present study could not be realized during one single year.

The complex analysis of the physico-chemical characteristics of the lacustrine waters and of their role in maintaining life was performed. Such a study, for the whole territory of Romania, has rarely been done, and even then, there were important gaps for some river basins and for the isolated lakes. In the places where the lakes in a small area had the same characteristics, only the most important aquatorium was mentioned, as being typical and representative for that territory and for those types of lakes.

2. Methodology

There are 3450 lakes in Romania, with a cumulated surface of 2,620 km^2, covering 1.1% of the total surface of Romania (Gastescu, 1971). Unfortunately, most of the lakes are human made, and the natural lakes, apart of being few their surface is insignificant (Romanescu, 2006).

The seasonal campaign during 6 years (2003, 2004, 2005, 2006, 2007 and 2008) had as a main purpose the complex characterization of lacustrine waters quality, by interpreting the results of the field measurements, with reference to the their classification in quality classes. A complex measurement set was used for the measurement of the physico-chemical parameters, and at the same time, samples of phytoplankton specific to the lacustrine waters were taken. The trophicity of the lacustrine waters required the characterization of several physico-chemical and biological indicators, determining and favouring its evolution: pH, CCO-Cr, CC=-Mn, CBO_5, total mineral nitrogen, total phosphorous, temperature, dissolved oxygen, transparency, nutrients, structure of aquatic biota (value of phytoplankton biomass, percentile value V90% of the plankton biomass, coli form bacteria) etc.

The physico-chemical parameters were interpreted at the Hydrology Laboratory of the Faculty of Geography and Geology, University “Al.I.Cuza” of Iasi, and the biological parameters were interpreted by the Natural Sciences Museum in Tulcea.

As some data for few of the lakes mentioned above were missing from our analysis, they could be taken from the Water Headquarters in Bucharest or from the regional hydrologic offices (I.N.M.H., 2006).

The data we obtained were reported to Order 1146/2002 in five quality classes, and the classification of the lakes was established by using the percentile system V (90%).

3. Results and discussions

The analysed area refers to the whole territory of Romania, especially to the natural lakes with ecologic and economic importance, as well as the most important human made lakes (figure 1).

While in the western part of Romania hydro-technical works have been built and a large part of the flood plain lakes were eliminated, in the eastern part of Romania the situation is reversed. In Moldova, the oldest and the most numerous human made lakes are registered, most of them with small dimensions. Still, some of these lakes cover significant areas and they have a complex role (Romanescu et al., 2005).

As a result of the fact that Romania landforms are very diverse (delta, extended flood plain, arid and wet plains, hills with high fragmentation, low and high mountains etc), the genetic types of lakes and the hydrologic balance specific to the above mentioned areas are various as well.

The complex analysis of the lakes was done on river basins: Danube (Portile de Fier I, Portile de Fier II, Gârla Mare, Bistretu, Suhaia, , Mariuta, Fundulea, Gurbanesti, Frasinet, Iazer, Galatui, Bugeac, Oltina, Dunareni, Brates, Saraturi, Ciuperca); Tisa (Buhaescu, Calinesti-Oas); Somes (Colibita, Firiza, Lala, Gilau, Stiucilor, Vârsolt, Dindesti, Bodi-Mogosa), Mures (Bezid, Ighis, Nedeiu, Petresti, Teliuc, Hateg, Bucura, Taut); Bega-Timis (Trei Ape, Surduc, Gozna, Secu); Nera-Cerna (Taria, Valea lui Iovan, Herculane); Jiu (Isalnita, Valea de Pesti, Lacul Mic, Gârla Mare, Rotunda); Olt (Mesteacanu, Sfânta Ana, Frumoasa, Gura Râului, Râmnicu Vâlcea, Dopca, Sacele, Babeni, Bradisor, Vidra, Slatina, Scoreiu, Bâlea); Arges (Zigoneni, Vâlcele, Budeasa, Golesti, Vidraru, Râusor, Facau, Gradinari, Pecineagu, Morii, Comana, Cernica); Ialomita (Caldarusani, Snagov, Amara, Fundata, Paltinu, Pucioasa, Maneciu, Dridu); Siret (Bucecea, Rogojesti, Galbeni, Dragomirna, Calimanesti, Izvorul Muntelui, Bâtca Doamnei, Poiana Uzului, Tungujei, Puscasi, Cazanesti, Solesti, Cuibul Vulturilor, Râpa Albastra, Jirlau, Amara, Balta Alba, Siriu, Cândesti, Rosu, Rediu); Prut (Cal Alb, Stânca-Costesti, Mileanca, Negreni, Dracsani, Catamaresti, Halceni, Tansa, Pârcovaci, Podul Iloaiei, Ciric, Gorban); Black Sea (Razim, Sinoie, Babadag, Nuntasi, Gargalîc, Tasaul, Siutghiol, Techirghiol, Tatlageac, Mangalia).

The most important lakes in all river basins were analysed. The present study does not refer to the salt lakes in the salt massifs (natural and human made) as they present different characteristics and they are used only therapeutically.

Analysing the distribution of the lakes over the territory of Romania, one can notice their absence in the western part of the country and an increased number in the east (Moldova, Baragan, and Dobrudja). The absence of lakes in the Plains of Somesului, Crisurilor and Timisului is caused by the drying up hydro-technical works in order to transform the land into agricultural fields.

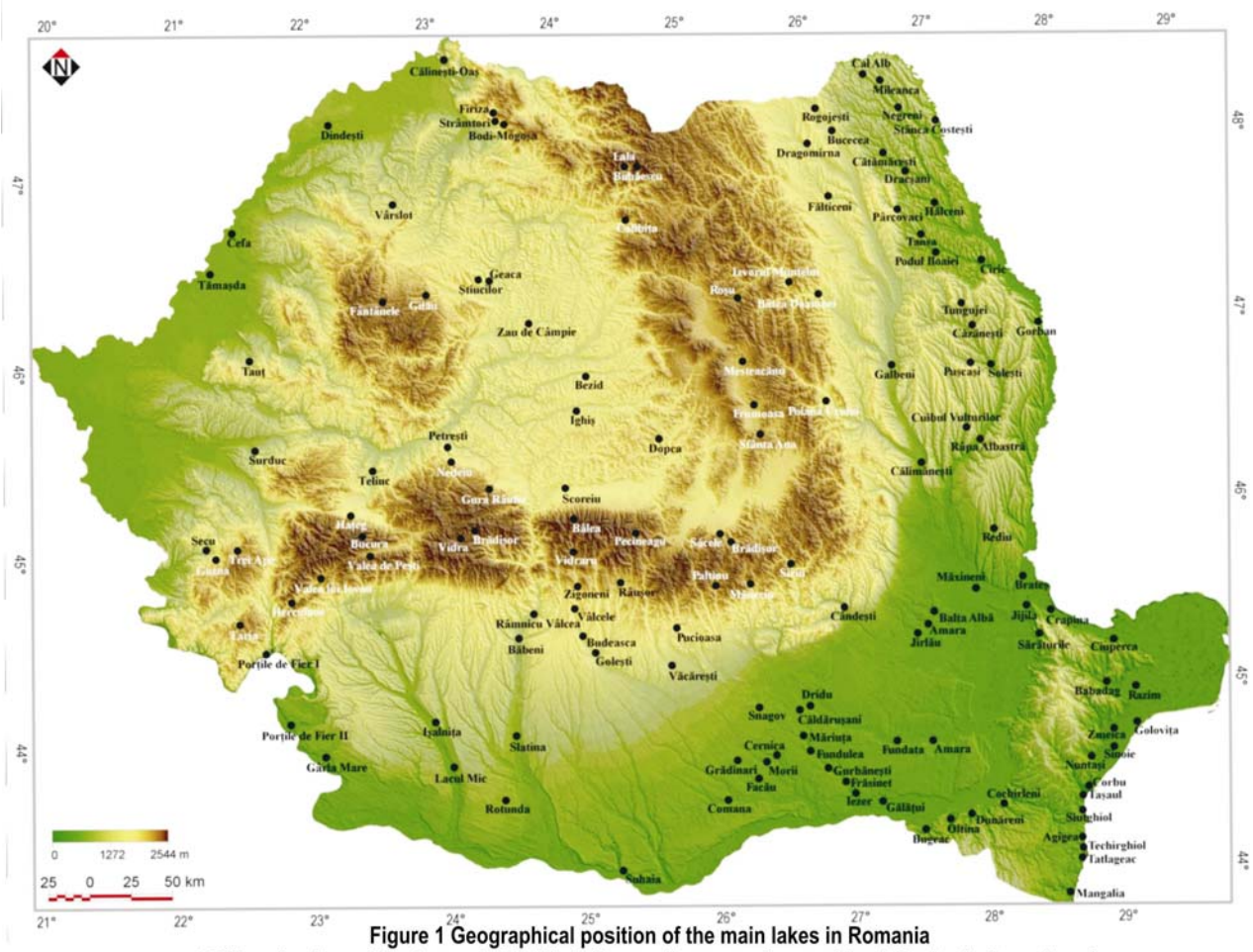

Figure 1 Geographical position of the main lakes in Romania
(different colour of the transcript facilitate the reading on surfaces with relatively similar colours)

The great number of lakes in Moldova (the Siret and Prut river basins) is explained by the reduced hydrological resources and the need to preserve them. For that reason, artificial lakes were built since antiquity, they had small dimensions and multiple usage. In the 15-16th centuries, about 3,500 ponds were recorded, while nowadays their number decreased to 350 (Geography of Romania I, 1983). Some of them were abandoned, other ones were silted due to the high rate of soil erosion (friable sub-stratum) (Romanescu et al., 2008).

Table 1 Morphometric characteristics and trophicity of the lakes in Romania

Partially according to I.M.H. Bucharest, 2006

Lake	Genetic type	Water course	Usage	Volume mln m^3	Surface ha	Maximum depth	Water quality (category)	
							Nutrients (total nitrogen, total phosphorous)	Biology
Danube river basin								
Portile de Fier I	Human made	Danube	energy	2900.0	10441	-	E	M
Portile de Fier II	Human made	Danube	energy	1000.0	5200	-	E	M-E
Gârla Mare	Floodplain	-	-	-	-	1,7	E-H	H
Bistretu	Floodplain	-	-	-	-	-	E-H	H
Suhaia	Floodplain	-	-	-	-	-	E	H
Mariuta	Human made	Mostistea	Complex	14.0	-	-	M	H
Fundulea	Human made	Mostistea	Complex	49.5	440	-	E	H
Gurbanesti	Human made	Mostistea	Complex	124.5	680	-	M	H
Frasinet	Human made	Mostistea	Complex	180.0	1460	-	E	O
Iezer	Human made	Mostistea	Complex	280.0	2600	-	E	M
Galatui	Floodplain	Berza	Fishing	8.5	750	2,0	E-M	H
Bugeac	Liman	Danube	Fishing	41.1	3002	1.70	E-H	H
Oltina	Liman	Danube	Fishing	60.0	2509	1.50	E-H	H
Mârleanu	Liman	Danube	Fishing	-	768	0.70	E	H
Cochirleni	Liman	Danube	Fishing	-	-	1.40	E	H
Brates	Floodplain	Prut	complex	-	7420	3,5	E	H
Saraturi	Floodplain	Danube	-	-	75	1,3	E	E
Ciuperca	Floodplain	Danube	recreational	-	-	2.5	M	E
Tisa river basin								
Buhaescu	Glacial	-	-	0.004	0.2	5	M-E	O
Calinesti-Oas	Human made	Tur	complex	29.0	160	9	E	E
Somes river basin								
Colibita	Human made	Bistrita	complex	101.2	314	50	E-H	O
Firiza	Human made	Sasar	complex	-	110.0	37.5	E	O
Lala	Glacial	-	-	-	0.6	2	UO	UO
Gilau	Human made	Somesul Mic	complex	4.2	70.0	9	M-E	UO
Strâmtori	Human made	Firiza	complex	16.6	113.0		E	M
Stiucii	Karsto-saline	Fizes	complex	1.8	68.7	12.7	M	O
Geaca	Human made	Fizes	complex	-	-	-		
Vârsolt	Human made	Crasna	complex	39.9	-	-	M	M
Dindesti	Human made		complex	-	-	-	M	M
Bodi-Mogosa	Floodplain	Sasar	complex	0.3	1.6	7	E-H	UO
Crisuri river basin								
Cefa	Human made	Collecting	fishing	-	925	-	M	M

		Channel						
Tamasda	Human made	Crisul Negru	fishing	-	200	-	M	M
Mures river basin								
Zau de Câmpie	Human made	Ludus	complex	-	117	-	E	M
Bezid	Human made	Cusmed	complex	31.0	150.0		E	O
Ighis	Human made	Ighis	Water supply	13.4	-		E-H	H
Nedeiu	Human made	Sebes	energy	-	-	3	E	M
Petresti	Human made	Sebes	energy	1.7	-		M	O
Teliuc	Human made	Cerna	Water supply	41.0	867	40	M	UO
Hateg	Human made	Râul Mare	complex	14.5	-		M	UO
Bucura	Glacial	Râul Mare	-	0.487	8.9	15.5	UO	UO
Taut	Human made	Nadas	complex	-	20	-	M	O
Bega-Timis river basin								
Trei Ape	Human made	Timis	complex	6.3	53	30	H	E
Surduc	Human made	Gladna	complex	66.3	460		E	H
Gozna	Human made	Bârzava	complex	12.0	60.0	40	H	E
Secu	Human made	Bârzava	complex	15.1	105	30	H	E
Nera-Cerna river basin								
Taria	Human made	Taria	Water supply	-	-	-	H	E
Valea lui Iovan	Human made	Cerna	complex	126.0	292.0	107	H	M
Herculane	Human made	Cerna	complex	15.7	86.6	-	H	M
Jiu river basin								
Isalnita	Human made	Jiu	Water supply	1.4	-	-	H	O
Valea de Pesti	Human made	Jiul de Vest	Water supply	5.0	-	53	M	UO
Lacul Mic	Glacial	Barbat	Tourism	-	-	10	M-E	E
Gârla Mare	Subsidence	Jiu	Tourism	0.600	-	-	M-E	E
Rotunda	Floodplain	Jiu	Tourism	1.4	100	-	H	H
Olt river basin								
Mesteacanu	Human made	Olt	Water supply	1.1	15	16	M-E	UO
Sfânta Ana	Volcanic	-	Tourism	0.250	19.5	7.5	M	M
Frumoasa	Human made	Frumoasa	Water supply	10.6			O-M	UO
Gura Râului	Human made	Cibin	Water supply	15.5	65	17	M	H
Râmnicu Vâlcea	Human made	Olt	Energy	19.0	-	-	E	M
Dopca	Human made	Valea Mare	Water supply	0.7	-		E	M
Sacele	Human made	Târlung	Water supply	18.3	-	37	M-E	UO
Babeni	Human made	Olt	Energy	78.3	-	-	H	UO
Bradisor	Human made	Lotru	Complex	38.0	-	-	M	H
Vidra	Human made	Lotru	Complex	340.0	1035	109	M	O
Slatina	Human made	Olt	Energy	31.0	498	10	H	E
Scoreiu	Human made	Olt	Energy	5.2	-	-	H	E
Bâlea	Glaciar	Cârtisoara	Tourism	0.240	180	11.35	UO	UO
Arges river basin								
Zigoneni	Human made	Arges	Energy	13.4	-	-	E	E
Vâlcele	Human made	Arges	Energy	44.0	-	-	E	M
Budeasa	Human made	Arges	Complex	55.0	-	-	E	O
Golesti	Human made	Arges	Complex	86.0	680	-	H	M
Vidraru	Human made	Arges	Complex	473.0	893	155	OM	O
Râusor	Human made		Energy	68.0	-	-	E	O
Facau	Human made	Ilfovat	Irrigations	3.0	-	-	H	M
Gradinari	Human made	Ilfovat	Complex	12.4	-	-	E	M
Pecineagu	Human made	Dâmbovita	Energy	69.0	182	-	E	O
Morii	Human made	Dâmbovita	Energy	19.6	246	-	E	E
Comana	Floodplain	Neajlov	Tourism	6.0	1000	-	H	M-E

Cernica	Human made	Colentina	Complex	8.8	311	-	H	E
Ialomita river basin								
Caldarusani	Liman	Ialomita	Tourism	4.5	224	5	H	E-H
Snagov	Liman	Ialomita	Tourism	17.2	576	9	E-H	M-E
Amara	Liman	Ialomita	Therapeutic	2.6	156	3	M-E	M-E
Fundata	Liman	Ialomita	Therapeutic	10.0	510	5	E-H	M-E
Paltinu	Human made	Doftana	Water supply	62.3	215	107	E-H	O
Pucioasa	Human made	Ialomita	Water supply	11.0	105	30	H	UO
Maneciu	Human made	Teleajen	Complex	58.0	192	-	H	O
Dridu	Human made	Ialomita	Complex	60.0	-	-	H	E
Siret river basin								
Bucecea	Human made	Siret	Complex	24.5	475	-	M-E	O
Rogojesti	Human made	Siret	Complex	48.4	800	9	M-E	O
Galbeni	Human made	Siret	Complex	71.0	1123	-	E-H	E-H
Dragomirna	Human made	Dragomirna	Water supply	17.0	106	-	M-E	M
Calimanesti	Human made	Siret	Energy	44.3	-	-	E-H	O
Izvorul Muntelui	Human made	Bistrita	Complex	1230.0	3000	90	M	M
Bâtca Doamnei	Human made	Bistrita	Energy	10.0	235	16	E	O
Poiana Uzului	Human made	Uz	Water supply	90.0	335	75	E-H	M
Tungujei	Human made	Sacovat	Complex	25.0	-	-	E	UO
Puscasi	Human made	Racova	Complex	20.7	-	-	H	O
Cazanesti	Human made	Stavnic	Complex	20.6	-	-	H	O
Solesti	Human made	Vasluiet	Complex	47.0	-	-	H	O
Cuibul Vulturilor	Human made	Tutova	Complex	54.6	1150	-	E-H	O
Râpa Albastra	Human made	Simila	Complex	25.8		-	H	UO
Jirlau	Liman	Valea Boului	Fishing	5.6	900	-	H	M
Amara	Liman	Buzoel	Fishing	3.6	600	3,0	H	M
Balta Alba	Liman	Boldul	Therapeutic	5.1	1012	4	H	M
Siriu	Human made	Buzau	Complex	158.0	360	-	E	O
Cândesti	Human made	Buzau	Complex	4.4	-	-	E-H	M
Rosu	Natural barrage	Bicajel	Tourism		13	7.5	M-E	UO
Prut River basin								
Cal Alb	Human made	Baseu	Complex	11.9	-	-	H	E
Stânca-Costesti	Human made	Prut	Complex	1400.0	140000	-	H	O
Mileanca	Human made	Podriga	Complex	9.5	-	-	H	E
Negreni	Human made	Baseu	Complex	19.8	304	-	M	O
Dracsani	Human made	Sitna	Complex	9.5	574	-	H	E
Catamaresti	Human made	Sitna	Fishing	14.0	-	-	H	M
Halceni	Human made	Miletin	Water supply	49.5	-	-	E-H	O
Tansa	Human made	Bahlui	Complex	33.0	360	7	E-H	UO
Pârcovaci	Human made	Bahlui	Water supply	5.5	-	-	M-E	UO
Podul Iloaiei	Human made	Bahluiet	Fishing	-	-	-	E	E
Ciric	Human made	-	Complex	-	-	-	E	E
Gorban	Floodplain	-	-	-	-	1,4	E	E
Black Sea Hydrographic basin								
Razim	Lagoon	-	Complex	909.0	39400	3	E	M
Sinoie	Lagoon	-	Complex	-	17150	2.3	H	H
Golovita	Lagoon	-	Complex	-	11870	2.5	H	H
Zmeica	Lagoon	-	Complex	-	5460	1.5	H	H
Babadag	Liman	Taita	Fishing	-	2470	3	E-H	H

Nuntasi	Lagoon	-	Complex	-	1050	1.3	H	H
Gargalîc	Marine liman	Cargalâc	Complex	7.7	528	2	H	H
Tasaul	Marine liman	Casimcea	Complex	60.0	2306	3.5	H	H
Siutghiol	Lagoon	-	Tourism	91.0	1960.0	17.5	H	H
Techirghiol	Marine liman	Urluchioi	Therapeutic	41.8	1161.0	9.75	H	H
Agigea	Marine liman	Agigea	Tourism	0.3	64.0	0.7	H	H
Tatlageac	Marine liman	Tatlageac	Complex	2.2	141.0	2.5	H	H
Mangalia	Marine liman		Complex	15.7	261.0	6	E	H

*H-hypertrophic; E-eutrophic; M-mesotrophic; O-oligotrophic; UO-ultraoligotrophic.

The trophicity degree of the lakes in the main river basins of Romania was determined by the analysis of the chemical aspects (according to the value of the nutrients) and the evolution of the aquatic cenoses (according to the value of the phytoplankton biomass). The qualifications are given by the following grades: hypertrophic, eutrophic, mesotrophic, oligotrophic and ultraoligotrophic, to which intermediate categories are added.

The eutrophic lakes are characterized by an important primary productivity, resulting in a high nutrient content. On the other side, the oligotrophic lakes have very reduced nutrient content, resulting in a low productivity. The mesotrophic lakes are situated between the two categories, with intermediate productivity. The hypertrophic and ultraoligotrophic lakes are situated ate the two extremes.

Table 2 Lacustrine waters trophicity according to the nutrients value

River basin	Total number of lakes	Trophicity degree															
		UO		O		O-M		M		M-E		E		E-H		H	
		Nr.	%	Nr.	%	Nr.	%	Nr.	%	Nr.	%	Nr.	%	Nr.	%	Nr.	%
Danube	21	-	-	-	-	-	-	3	14.29	1	4.76	13	61.90	4	19.04	-	-
Tisa	2	-	-	-	-	-	-	-	-	1	50.00	1	50.00	-	-	-	-
Somes	10	1	10.00	-	-	1	10.00	3	30.00	1	10.00	2	20.00	2	20.00	-	-
Crisuri	2	-	-	-	-	-	-	2	100.00	-	-	-	-	-	-	-	-
Mures	9	1	11.11	-	-	-	-	4	44.44	-	-	3	33.33	1	11.11	-	-
Bega-Timis	4	-	-	-	-	-	-	-	-	-	-	1	25.00	-	-	3	75.00
Nera-Cerna	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	100.00
Jiu	5	-	-	-	-	-	-	1	20.00	2	40.00	-	-	-	-	2	40.00
Olt	13	1	7.69	-	-	1	7.69	4	30.77	2	15.38	2	15.38	-	-	3	23.07
Arges	13	-	-	-	-	1	7.69	-	-	-	-	7	53.85	-	-	5	38.46
Ialomita	8	-	-	-	-	-	-	-	-	1	12.50	-	-	3	37.50	4	50.00
Siret	21	-	-	-	-	-	-	1	4,76	4	19,04	4	19,04	6	28,57	6	28,57
Prut	12	-	-	-	-	-	-	-	-	1	8.33	3	25.00	2	16.66	6	50.00
Black Sea	13	-	-	-	-	-	-	-	-	-	-	2	15.38	1	7.69	10	76.92

*H-hypertrophic; E-eutrophic; M-mesotrophic; O-oligotrophic; UO-ultraoligotrophic.

The geographical location of the lakes, in distinct landform units (mountains, hills, and plains, littoral) creates different environment for the manifestation of the trophicity.

We can notice the fact that, according to the value of the nutrients, the greatest part of the lakes are situated in the mesotrophic, meso-eutrophic, eutrophic, eutro-hypertrophic, and hypertrophic category (121 of the total 136, meaning 88.97%). Only in the mesotrophic category 18 lakes are included (13.23%). In the two extreme categories 3 lakes are ultraoligotrphic (2.2%) and 42 lakes are hipertrophic (30.88%).

Table 3. Trophicity of lake waters according to the phytoplankton biomass value

River basin	Total no of lakes	Trophicity degree															
		UO		O		O-M		M		M-E		E		E-H		H	
		Nr.	%	Nr.	%	Nr.	%	Nr.	%	Nr.	%	Nr.	%	Nr.	%	Nr.	%
Danube	21	-	-	1	4.76	-	-	2	9.52	1	4.76	3	14.28	-	-	14	66.66
Tisa	2	-	-	1	50.00	-	-	-	-	-	-	1	50.00	-	-	-	-
Somes	10	3	30.00	3	30.00	-	-	4	40.00	-	-	-	-	-	-	-	-
Crisuri	2	-	-	-	-	-	-	2	100.00	-	-	-	-	-	-	-	-
Mures	9	3	33.33	3	33.33	-	-	2	22.22	-	-	-	-	-	-	1	11.11
Bega-Timis	4	-	-	-	-	-	-	-	-	-	-	3	75.00	-	-	1	25.00
Nera-Cerna	3	-	-	-	-	-	-	2	66.66	-	-	1	33.33	-	-	-	-
Jiu	5	1	20.00	1	20.00	-	-	-	-	-	-	2	40.00	1	20.00	-	-
Olt	13	5	38.46	1	7.69	-	-	3	23.07	-	-	2	15.38	-	-	2	15.38
Arges	13	-	-	5	38.46	-	-	4	30.77	1	7.69	3	23.07	-	-	-	-
Ialomita	8	-	-	-	-	-	-	-	-	1	12.50	3	37.50	-	-	4	50.00
Siret	21	3	14,28	9	42,86	-	-	8	38,10	-	-	-	-	1	4,76	-	-
Prut	12	2	16.66	3	25.00	-	-	1	8.33	-	-	6	50.00	-	-	-	-
Black Sea	13	-	-	-	-	-	-	1	7.69	-	-	-	-	1	7.69	11	84.61

*H-hypertrophic; E-eutrophic; M-mesotrophic; O-oligotrophic; UO-ultraoligotrophic.

According to the phytoplankton biomass value a large number of lakes are included in the category ultraoligotrophic, oligotrophic and oligo-mesotrophic (91 of 136, representing 66.91%). In the mesotrophic category 29 lakes are included (21.32%). A number of 17 lakes are included in the ultraoligotrophic category (12.5%) and 33 lakes in the hypertrophic category (24.26%).

The most hypertrophic lakes are situated in low landform units, where temperatures are high and quantity of nutrients is extremely high. The most favourable area for a high trophicity is represented by the Danube flood plain (Romanian Academy, 1967).

The most ultra-oligotrophic lakes are found in the high mountain area. All the glacial lakes are included in this category. To these, the reservoirs with cold water, developed on hard rocks can be added.

In the area with the highest density of lakes (Moldova) there are lakes (aquatoriums) with good and very good trophicity (see the Siret and Prut river basins). Because of this reason, many of the accumulation lakes in the Moldavian Plateau are the most important aquatoriums for fishing industry (the second region in Romania, following the Danube Delta).

Besides the climate, the trophicity is strongly influenced by the nature of rocks within the drained river basin, by the erosion rate, by transparency and turbidity etc.

The general analysis of the lakes on the territory of Romania clearly demonstrates the fact that they are included, to the greatest extent, into the category of lakes with medium and high trophicity.

Conclusions

The number of the lakes in Romania is relatively great, but their area is often reduced. The most numerous lakes are human made, situated mainly in the northern Moldova and Transylvania. The most important analysed lakes were limited within the river basins. In the present study the salty lakes in the salt massifs were not analysed as they present different characteristics and they are used only therapeutically.

The trophicity degree is given by 5 main qualifications (hypertrophic, eutrophic, mesotrophic, oligotrophic, ultraoligotrophic) and separates the lakes on the territory of Romania according to the landform units and climate. Trophicity can be also influenced by the nature of rocks. According to the value of the nutrients, most of the lakes are included in the mesotrophic, mesoeutrophic, eutrophic, eutro-hypertrophic and hypertrophic categories. The lakes with the best trophicity are used for fishing as well.

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