

## THE QUALITY OF WATER AS THE MAIN PARAMETER OF HYGIENIC VALUE

**Robert Wrzesien, Elzbieta Budzinska-Wrzesien,**

*Division of Animal and Environment Hygiene  
Warsaw Agricultural University, Ciszewskiego str.8, 02-786 Warsaw, Poland*

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### **Introduction**

In Warsaw ZOO we have several basins with exotic water birds. The aim of this investigation was to establish how fast the quality of water is decreased and if it is dangerous in Public savage system. There are flamingos, exotic ducks, geoses and mandarines. Of course the terrain is open and we have some birds from nearby lake and river wild ducks doming and nesting.

### **Matherial and Methods**

In this investigations 150 samples of water were examined. Water was putted into sterile containers of capacity 120 ml. Samples were taken twice a week. All samples were examined in Warsaw University Laboratory or in Sanepid Laboratory using incubation which was performed in 37<sup>0</sup>C for 48 hours.

Tab. 1: Complete analysis of water from ZOO in May 2004.

	parameter	unit	NORM	result	Maximum level
1.	Cloud	mg/l	PN-79/C-04583.03	5	1
2.	Colour (Pt)	mg/l	PN-74/C-04558	20	15
3.	smell	-	PN-72/C-04557	Not accepted	accepted
4.	Taste	-	PN-72/C-04557	Not accepted	accepted
5.	acidity	Ph	PN-76/C-04540	7,9	6,5÷9,5
6.	(CaCO3)	mg/l	PN-71/C-04554.02	245	60÷500
7.	(O2)	mg/l	PN-85/C-04578.02	7,5	5,0
8.	(NH4+)	mg/l	Methodic Hach	0,47	1,5
9.	(NO2-)	mg/l	Methodic Hach	0,036	0,5
10.	(NO3-)	mg/l	PN-82/C-04576.08	1,3	50,0
11.	(CL-)	mg/l	PN-ISO-9297:1994	61,0	250,0
12.	(Fe)	mg/l	Methodic Hach	0,25	0,2
13.	(Mn)	mg/l	P-92/C-04590.02	0,01	0,05

Tab. 2. Bacteriology assessment of water from ZOO in May 2004.

Lp.	Parametr	NORM	result	Maximum level
1.	Number of bacteria on agar 22°C in 1 ml of water	PN-ISO-6222:1999	5100	100
2.	Number of bacteria on agar 37°C in 1 ml of water	PN-ISO-6222:1999	4000	20
3.	Number of E. coli Spp in 100 ml water	PN-ISO-9308-1	15	0
4.	Number of E. Coli fecal type in 100 ml water	PN-ISO-9308-1	15	0
5.	Fecal streptococci in 100 ml water	PN-82/C-04615.25	500	0

Tab. 3: Complete analysis of water from ZOO, June 2004

	Parameter	unit	NORM	result	Maximum level
1.	Cloud	Mg/l	PN-79/C-04583.03	3	1
2.	Colour (Pt)	Mg/l	PN-74/C-04558	35	15
3.	Smell	-	PN-72/C-04557	Not accepted	accepted
4.	Taste	-	PN-72/C-04557	Not accepted	accepted
5.	Acidity	Ph	PN-76/C-04540	9,5	6,5÷9,5
6.	(CaCO <sub>3</sub> )	Mg/l	PN-71/C-04554.02	180	60÷500
7.	(O <sub>2</sub> )	Mg/l	PN-85/C-04578.02	8,5	5,0
8.	(NH <sub>4</sub> <sup>+</sup> )	Mg/l	Methodic Hach	0,17	1,5
9.	(NO <sub>2</sub> <sup>-</sup> )	Mg/l	Methodic Hach	0,047	0,5
10.	(NO <sub>3</sub> <sup>-</sup> )	Mg/l	PN-82/C-04576.08	below 0,01	50,0
11.	(CL <sup>-</sup> )	Mg/l	PN-ISO-9297:1994	68,2	250,0
12.	(Fe)	Mg/l	Methodic Hach	0,2	0,2
13.	(Mn)	Mg/l	P-92/C-04590.02	0,02	0,05

Tab. 4. Bacteriology assessment of water from ZOO – June 2004.

LP.	Parametr	NORM	result	Maximum level
1.	Number of bacteria on agar 22°C in 1 ml of water	PN-ISO-6222:1999	300	20
2.	Number of bacteria on agar 37°C in 1 ml of water	PN-ISO-6222:1999	700	0
3.	Number of E. coli Spp in 100 ml water	PN-ISO-9308-1	700	0

Estimated water is too much contaminated and overdose level of bacteria than in norm Rozp. M. Z. 19-11-2002 (Dz.U.Nr 203 poz.1718).

### Results and Discussion

The quality of water from basin from ZOO is inappropriate all parameters investigated in this subject were not acceptable. Taste and smell have to be intangible. The other

parameters were also on not acceptable level in comparison with norm - Rozp.M.Z. 19.11.2002r.(Dz.U.Nr.203 poz.1718). The numbers of bacteria colony were fifteen Times more than it is admit by this norm. Bacteriologic test detected the Escherichia coli spp. in inadmissible number 700 in 100 ml water. Clearing treatment of the basin is carried out once a week. In this time the drastic level of bacteria was detected. Unfortunately most of feces contaminated fresh water in basin. After clearing and filling the basin with New fresh water the bacteria grows very fast in contaminated water. The feed for birds is given on basin bank. Birds eats the feed and contaminated water in basin by it. The fact that the basin is very shallow and made by concrete there is no way to clear the water itself. All those facts shows, that the water is too contaminated for fito or zooplankton, what can be a natural filter. It seems that the problem can be solved by making a still flow of water. Additionally to improve the water quality it can be installed a fountain to put more oxygen into the water.

### **Conclusions**

1. Water in basin for duck is potential infectious and May be reason of disease of birds. Quality of this water is on very low level and should be decontaminated before putting into City Sewage System
2. This is possible, that birds on this basin will have huge heath problem specially with immunosupresses viruses, and Streptococci Spp. bacteria.

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Date	Sediment	Colour	Zapach	Taste	Ph	streptococci API	e-coli API	e-coli fce API	agar 22 st	agar 37 st
2004 year										
1 27-02	+	15	not perceptible	accepted soil origin	7,2	No result	No result	+	-	-
2 05-03	+	15	not perceptible	accepted soil origin	7,2	+	+	+	-	-
3 12-03	+	15	not perceptible	accepted soil origin	7,1	+	+	+	-	-
4 09-04	+	15	not perceptible	accepted soil origin	7,1	+	+	+	-	-
5 16-04	+	20	accepted soil origin	accepted soil origin	7,1	+	+	+	-	-
6 23-04	+	20	accepted soil origin	accepted soil origin	7,1	+	+	+	-	-
7 30-04	+	20	accepted soil origin	accepted soil origin	7,0	+	+	+	-	-
8 07-05	+	20	accepted soil origin	accepted soil origin	7,3	+	+	+	-	-
9 14-05	+	20	accepted soil origin	accepted soil origin	7,3	+	+	+	-	-
10 21-05	+	20	accepted soil origin	accepted soil origin	7,4	+	+	+	-	-
Zoo 24-05	5	20	accepted	accepted	7,9	500	15	15	4000	5100
11 28-05	+	20	accepted soil origin	accepted soil origin	7,6	+	+	+	-	-
12 04-06	+	20	accepted soil origin	accepted soil origin	7,6	+	+	+	-	-
13 11-06	+	25	accepted	accepted	8,5	+	+	+	-	-
14 18-06	+	25	accepted	accepted	9,0	+	+	+	-	-
15 26-06	+	30	accepted	accepted	9,0	+	+	+	-	-
Zoo 29-06	3	35	accepted	accepted	9,5	no result	60	700	no result	300
Agrikola sanepid	1	15	accepted	accepted	8,9	no result	60	700	no result	70

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Tab.5. Complete analysis of water from ZOO