

DIAGNOSIS ON THE CURRENT SITUATION OF CERTAIN WETLANDS OF THE OUED RIGH REGION (ALGERIAN SOUTHEAST)

Oum Elkheir BACHI^{1,2}, Med Amine BENHADDIA¹, Ali LAHCINI¹ and Youcef HALIS¹

¹Scientific and Technical Research Center in Arid Regions -Touggourt station –Algeria.

²University of Kasdi Merbah Ouargla, Laboratory of Saharan bio-resources: conservation and valorization, Faculty of Sciences of Nature and Life, Ouargla 30000 Algeria.

E-mail: nawelecol@yahoo.fr

¹Scientific and Technical Research Center in Arid Regions -Touggourt station –Algeria.

amine_bhd@yahoo.fr

¹Scientific and Technical Research Center in Arid Regions -Touggourt station –Algeria.

lahciniali@gmail.com

ABSTRACT

Water plans are many in Algeria and shelter very precious and diversified biological resources. These environments are of fresh, brackish, salty or hyper-salty water. The first ones are widely used for the irrigation. Other environment can be valorized by a rational and long-lasting exploitation for their fauna or for the salt which they produce. Wetlands situated in arid and semi arid zones (chotts, sebkhas, lakes, geltas and oasis) are important water reservoirs for the local communities and which receive several species: either aquatic (fishes, crustaceans, seaweeds ...), or no-migratory and migratory birds. They have to benefit, in the future, from a particular attention on behalf of the State and of the international community.

The wetlands of the region of Oued Righ (Algerian southeast) constitute particularly sensitive environments. They play a very important ecological role within the hydro-system and an economic role for the local actors.

In the valley of Oued Righ, the physical chemical quality of surface water of these last year's knew a big deterioration. The discharges of the urban areas and the industrial park are directly often forwarded at the courses of waters and they are the causes of the ecological disturbances of the wetlands of the region subscribed on the list RAMSAR.

Keywords: Wetlands, Oued righ, Chemical composition, Pollution

1. INTRODUCTION

Wetlands play a vital role in the hydrological cycle. They are natural harvesters of rainwater, acting as sinks into which surface water and/or groundwater flows from the surrounding catchment. Wetlands store this water for varying amounts of time. Some replenish groundwater and some regulate river flows. Some also clean water, removing pollutants and sediment. However, not all wetlands perform all these environmental services. The exact role they play depends on a wide range of site-specific features, including the type and location of the wetland [1]

Wetlands should be studied as part of wider hydrological systems and basins. The water in a wetland is influenced by activities upstream, and the use of water in a wetland has an impact on the water quality and quantity downstream. For example, high rates of extraction for agricultural use will affect the amount of water flowing out of a wetland, not just the amount in the wetland itself. It is essential to consider these flows when determining management options for wetlands. [1]

The region of Oued Righ, situated in Algerian Sahara (arid region) contains numerous wetlands, those last need to be protected in order to preserve water and by the way keep the ecosystem in this region.

In our work, we have to study some physical and chemical parameters of six wetlands water of this region in order to identify their current situation.

2. EXPÉRIEMENTATION

2.1. SITE OF STUDY

The study was done in the valley of Oued Righ (Figure 1), which is situated between EL Goug (32°54'N) and Oum EL Thiour (34 ° 9'N) including three big towns, Touggourt (top), Djamaa (means) and Mgheir (bottom). This region is characterized by a much contrasted climate [1].

During our field trials, we realized three water samplings for each one of six wetlands studied (Temacine, Merdjadja, Megarine, Sidi Slimane, Ayata and Ain Zarga).



Figure1: Oued Righ location

The climate of Oued Righ is typically Saharan, characterized by very weak precipitation (less than 70), high temperatures (more than 45°C in summer) very long period of sunshine (about 3000 Hour by year) and low relatively humidity (less than 20% in hot periods).

2.2. Materials and method

To study the quality of wetlands water, color, smell, turbidity, water temperature, PH, dissolved oxygen, electric conductivity and some chemical elements have been analyzed three times (three different dates).

For analyzing, we have used multi-parameter for measuring pH, dissolved oxygen, conductivity and water temperature; turbid meter for turbidity and spectrophotometer for chemical elements.

3. Results and discussion

3.1. Color, smell and turbidity

These parameters give the general quality of water by sight and smell; this latter reflect the hygienic quality of the water. For all stations, we noticed a transparent color except the lake of Sidi Slimane in which we observed shady color, which can be explained by the existence of the sand or the clay in suspension,

and this explains the high turbidity (296,9 NTU) marked in this station (figure 2), it would seem that a turbidity superior to 5 NTU would limit the destruction of coliformes [3].

For the smell, we noticed a stench at the lake Ayata, and a light stench at the lake of Témacine and Medjadja, for the others stations, we noted no stench, these results generally from organic matters, from aquatic bodies, or from bacteria Clostridium which gives off the H₂S (source of bad stenches) [4]

3.2. pH

The registered pH was basic and close to the neutrality, it oscillated between 7,83 et 8,18 (figure2), this parameter depends to numerous factors: photosynthetic activity which is the origin of pH water increase and the nature of rocks. This interval of pH gives a favorite environment of production of animal and vegetable species. It is important here to note that urban and agriculture wastewaters are rejected in those wetlands which raises the pH [5].

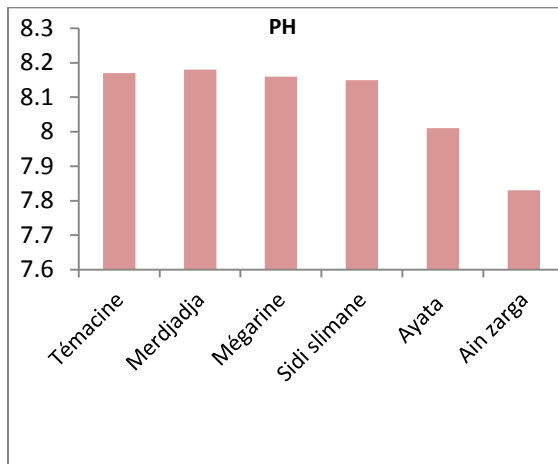


Figure 2: water pH of the wetlands.

3.3. Conductivity

The values of the conductivity vary between 1085 and 2900 $\mu\text{s} / \text{cm}$ in 25 °C (figure 3), this high mineralization is due to the nature of the soil composition and water quality of the region which are very salty [6], [7].

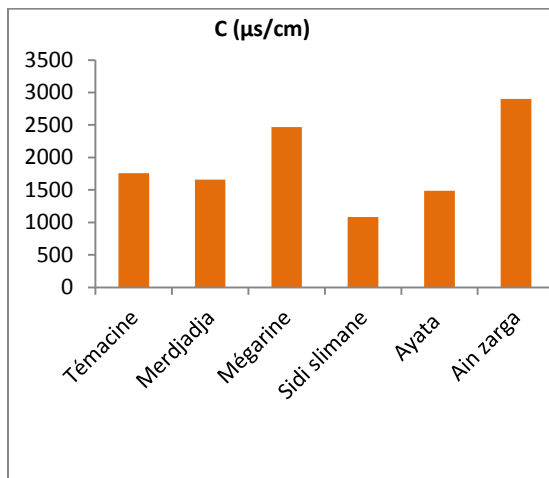


Figure 3: water conductivity of wetlands.

3.4. Dissolved oxygen

Dissolved oxygen was very high (more than 7 mg / l) (figure 4), those important values were due to the abundance of vegetation and the importance air flow in the period of experiment (winter and spring), because our wetlands are situated next to or in oases [5].

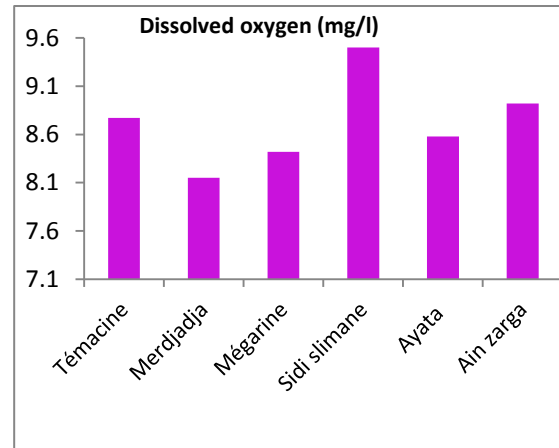


Figure 4: water dissolved oxygen of wetlands.

3.5. Water temperature

Concerning water temperature (figure 5), we registered ideal values for the life of fishes (between 19.4 and 22 °C) [3]. Those values were due to low air temperature for this period (samples were taken morning time 9:00 am to 11:30 am).

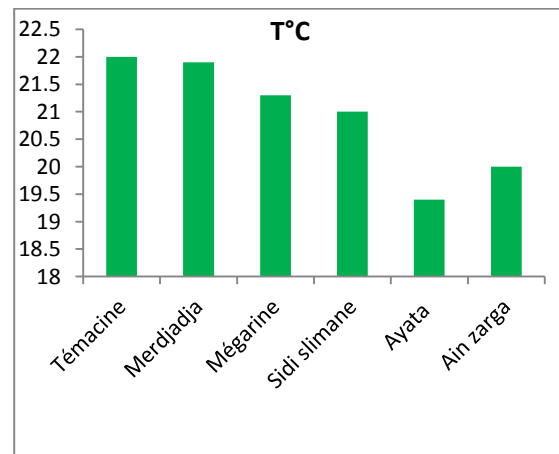


Figure 5: water temperature of wetlands

3.6. Chemical elements

Figure 6 shows that there was an augmentation in the concentration in major chemical elements in all stations, this can be due to the accumulation of agricultural wastewaters which causes dissolution of a number of salts (bicarbonates, chlorides, sulfates, calcium, sodium, etc.) [8].

So wastewaters which are rejected in the canal of Oued righ have an important role in the rise of salts concentration. Concentrations in major chemical elements in lakes of Sidi Slimane and Merdjadja were lower in comparison with the other lakes;

because they are far from conglomerations, thus the anthropological effect is negligible.

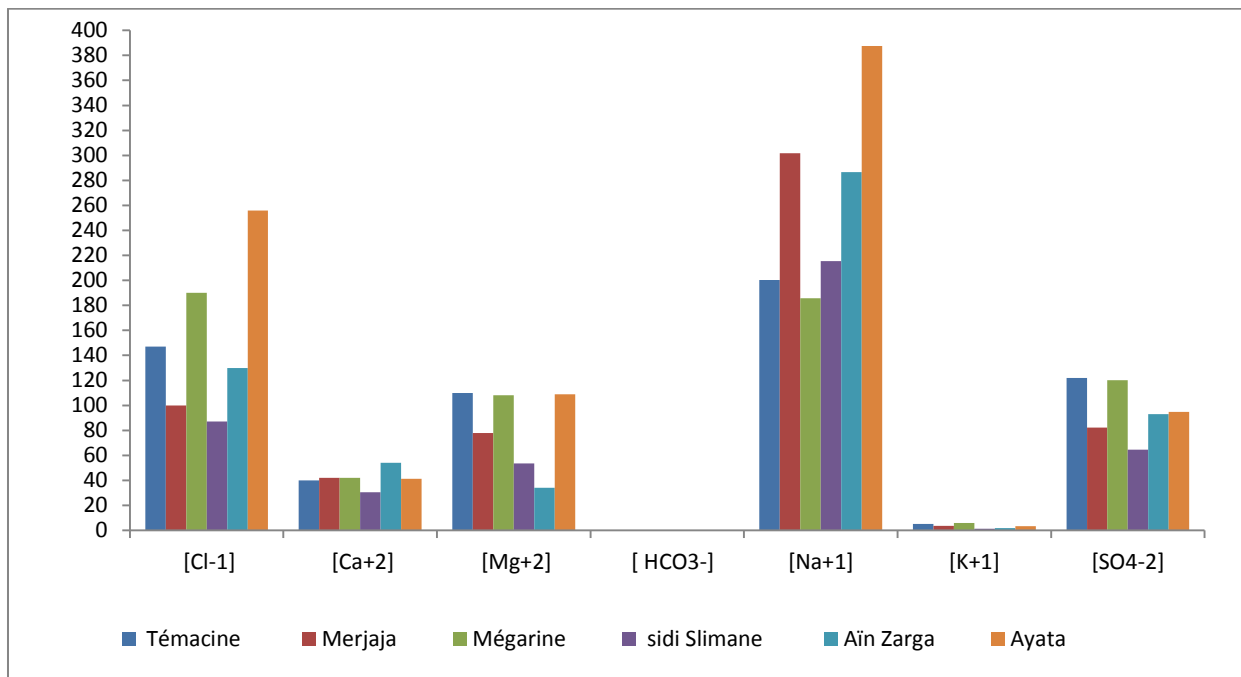


Figure 6: major chemical elements

4. CONCLUSION

The rearrangement of wetlands of Oued righ region becomes one of the main concerns of the water and environment sectors. Thus it is interesting to sensitize the local authorities on the necessity of protecting this heritage. Particularly those certain wetlands of the valley of Oued Righ, have a tourist mark. This one became the privileged place of visitors. The transparency of its water allows finding some fishes in the depths, which make the happiness of the fishermen. To conclude, these natural sites are a heritage which must be absolutely protected.

So, the preservation plan has to contain the coverage of the disposals of urban wastewater in the big canal of oued Righ in particular in the lake of Temacine, the restoration and the cleaning out of the canal, which is the place where agricultural and some urban wastewater, Awareness campaigns for people and pupils have to be organized by the scientific and technical Research center on the arid regions (CRSTRA-TOUGGOURT-).

At the end, it is preferable to study the possibility of reusing wastewater for agriculture or treats it before rejecting it in the canal.

5. REFERENCES

- [1] MC CARTNEY et al, 2014: wetlands and people international water management institute (IWMI), doi:10.5337/2014.202, 32 p.
- [2] CRSTRA, 2012 : *Caractérisation et typologie des zones humides de la région de l'Oued Righ* Projet d recherche dans le cadre des orientations stratégiques de recherche du Centre de recherche scientifique et technique sur les régions arides - CRSTRA - équipe zones humides Touggourt, 109 P.
- [3] FRANK, 2002 : *Analyse de l'eau (Aspects réglementaires et techniques)*. Ed, Collection biologie technique, 360 p.
- [4] BACHI O., 2010 : *Diagnostic sur la valorisation de quelques plantes du jardin d'épuration de la station du vieux Ksar de TEMACINE*, Mémoire de Magister, Agronomie saharienne univ. de Ouargla, 105 p.

[5] KADRI, I et al, 2012 : *évaluation de la qualité du cours supérieur de l'Oued Za (Maroc)*, revue science en liberté, Ed. Merssenne : volume 4, N° 120709.

[6] DUBOST D., 2002 : *Ecologie, aménagement et développement agricole des Oasis algériennes*. Ed.C.R.S.T.R.A. Biskra, 423p

[7] INRA, 2005 : *Programme d'activités de la Station, institut national de recherches agronomiques*. Sidi Mahdi, Touggourt, 49p.

[8] BLIFERT C. et PERRAUD R., 2003 : *Chimie de l'environnement*. Ed. de Boeck, Paris, 477p.