

THE SODIUM CHLORIDE MINERAL WATERS IN MUREȘ COUNTY, LASTING TOURISM PROTECTION AND CAPITALIZATION

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ABSTRACT. The sodium chloride mineral waters in Mureș County, lasting tourism protection and capitalization. This study represents a continuation of the research and assessment of sodium chloride mineral water resources on the territory of the Transylvanian Depression, especially regarding the emergence of salt springs, which are still not to be found in the scholarly literature. Therefore, Mureș County will be analysed this time, a county where certain researches have been done before. Field research can be also added to these, representing the only possibility to update the data regarding the existent salt springs. The first examples already known are the sodium chloride mineral waters billeted in the lakes located in Sovata and Jabeșița. Locations with sodium chloride mineral waters which appear at the surface under the form of salt springs with a salinity exceeding 1 g/l, as compared to the ones specified, are Sărmășel, Târnăveni, Sângeorgiu de Mureș, Gurghiu, Orșova, Brâncovenești, Lunca Mureșului, Ibănești and Ideciu de Jos. As far as the protection of these resources is concerned, the main debated problems are related to phenomena such as their clogging and desalination, which causes many sodium chloride mineral water springs to become ephemeral.

Keywords: salt water springs, salt lakes, clogging, desalination

1. TERRITORIAL DISTRIBUTION OF SODIUM CHLORIDE MINERAL WATER RESOURCES IN MUREȘ COUNTY

Continuing the previous research focused on finding new locations with salt waters on the territory of the Transylvanian Depression and after the elaboration of some studies on Sibiu, Cluj and Alba counties, Mureș County is now to be analyzed, as part of this conference. As regards the geographical distribution, most of the sodium chloride mineral waters are grouped in Reghin – Valea Gurghiului area, another important area is Sovata, while the others have a punctual character and are mostly present at great depths being extracted by drilling.

The latest research reveals several hydrosaline areas on the territory of Mureș County, at Sovata, Jabeșița, Ideciu de Jos and Sângeorgiu de Mureș. However, if we analyse the territory of this county, a series of salt water springs can be found in isolated and hardly accessible areas, such as in Sărmășel, Lunca Mureșului, Brâncovenești, Orșova, Gurghiu, Ibănești, Târnăveni, while others are under research currently.

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Table 1. Current state of sodium chloride mineral waters in Mureș County in 2014

No.	Location	Administrative territory	Current state
1.	Sărmășel	SĂRMAȘU	salt lakes
2.	Lunca Mureșului	ALUNIȘ	salt springs
3.	Brâncovenești	BRÂNCOVENEȘTI	salt springs
4.	Ideciu de Jos	IDECIU DE JOS	salt springs and lake
5.	Orșova	GURGHIU	salt springs
6.	Gurghiu	GURGHIU	salt springs
7.	Jabeșița	SOLOVĂSTRU	salt springs
8.	Ibănești	IBĂNEȘTI	salt spring and lake
9.	Sângeorgiu de Mureș	SÂNGEORGIU DE MS.	clogged springs
10.	Sovata	SOVATA	salt springs and lakes
11.	Târnăveni	TÂRNĂVENI	salt springs and lake

1.1. Sovata

It has a diverse hydrosaline potential if taking into consideration the seven well-known lakes: Ursu, Aluniș, Mierlei, Roșu, Verde, Paraschiva, and Negru located in the north-eastern part of the Sovata resort. The area with the emergence of some springs is in the southern part. It includes the following springs: Maria, Rosza, Nadăș, Varga, with a very low salinity, while the only sodium chloride spring is located at the foot of Zoltan Hill, with a salinity of more than 100 g/L.

1.2 Sângeorgiu de Mureș

Salt waters are present at great depths (over 800 m). As a consequence, numerous wells were dug for the development of several spa facilities that required good quality water. Therefore, three wells for salt water were achieved, used for the local outdoor swimming pool or the spa treatment facilities.

Their chronological order is as follows: well no. 1 became operational in 1912, with a depth of 864 m and a discharge rate of 17 m³/day; well no. 2 is 799 m deep and, due to subsequent improvements, it came to a very high discharge rate of 0.5 L/s, while the last well, no. 3, is more recent, since 1977, and is 915 m deep.

Currently, wells no. 1 and 3 are in conservation, but salt water is exploited by pumping from well no. 2, which has a daily discharge rate of 72 m³ and a high mineralization of more than 120 g/L.

1.3. Sărmășel

During the interwar period, a small tourist facility called *Băile Sărmășel* was functional in this locality, based on the deep sodium chloride waters in the gas storage dome area. Currently, there is only the reservoir with a low salinity, while the former building was converted into a warehouse for building materials.

1.4. Lunca Mureşului

Long ago, several small salt water basins were arranged in this place to be used by locals, which are now in poor condition. The first basin has a regular shape, with its sides of approximately 4 x 4 m. Further to west, there is a smaller basin, also square, with its sides of approximately 2 x 2. The hydro-saline area is situated also on the left bank of the Mureş and is visible through the existent halophilic vegetation.

1.5. Brâncoveneşti

The presence of salt and salt waters is recorded in several areas. The first is the one on the western slope of Dealul Sărat, in the southern part, where there is a salt water spring arranged as fountain, whose water flows into a small excavation under the form of a small salt lake. The second area, called Poiana Sărată, is located in the forest on the outskirts of the village, where there are seven sodium chloride water springs.

1.6. Ideciu de Jos

It represents the most important tourist settlement in the area, located just 5 km north of the Municipality of Reghin. The salt water springs discovered here have been captured and used for a modern swimming pool. Besides the swimming pool, a fountain was arranged under the form of a covered small house, where salt water can be used for different purposes.

1.7. Jabeşiţa

In a former salt exploitation site an artificial salt lake was formed, with a maximum depth of 11.9 m and an area of 713 m², lately arranged as swimming pool of local interest. The lake is divided into three sectors: a 0.5 m deep sector for children, a 1.5 m deep sector for non-swimmers and the greatest sector, which covers three quarters of the total area in the north-eastern part where the greatest depth is (M. Alexe, 2006). Besides this lake, in the north-western part of the village, where the roof strata were affected by landslides, three lakes were formed behind the landslide debris deposits (Lacul Fără Fund, Lacul cu Trestie and Lacul Baia de Nămol), heavily silted and desalinated, with the exception of the last one, preserved in the form of a pond with a thick layer of sapropelic mud. East of the village, in the place of a salt water spring, a covered fountain was arranged, especially for using and preserving the local water quality.

1.8. Gurghiu

The presence of salt water in the form of a fountain on the left side of the Gurghiu – Reghin road is linked to Dealul Slatini nearby. Câmpul Sărat, drained by Pârâul Sărat, with halophilic vegetation and salt water springs, is also nearby.

1.9. Orșova

Representative for this village belonging to the commune of Gurghiu is Dealul Slatinii, located in the north-west, with a length of 4.2 km and a width of 600 m. It presents four major saline areas where salt water is also present: two are located at the north-eastern end, towards the commune of Gurghiu, with salt water springs that used to supply brine for the inhabitants of Gurghiu, also the source of Pârâul Sărat. The other two areas are located near the village of Orșova, where there are fountains and springs that supply salt water for the locals.

1.10. Ibănești

According to the information obtained so far, the only location with sodium chloride mineral water is at the entrance into the village from Reghin, represented by a salt water pool.

1.11. Târnăveni

It represents a new tourist location with further facility possibilities, located east of the Municipality of Târnăveni, about one kilometre from the end of Băilor Street, which facilitates the access to this salt water pond. The current aspect of this site is of a pond supplied with water from several springs, with a total area of 529 m² and a depth of 0.7 m.

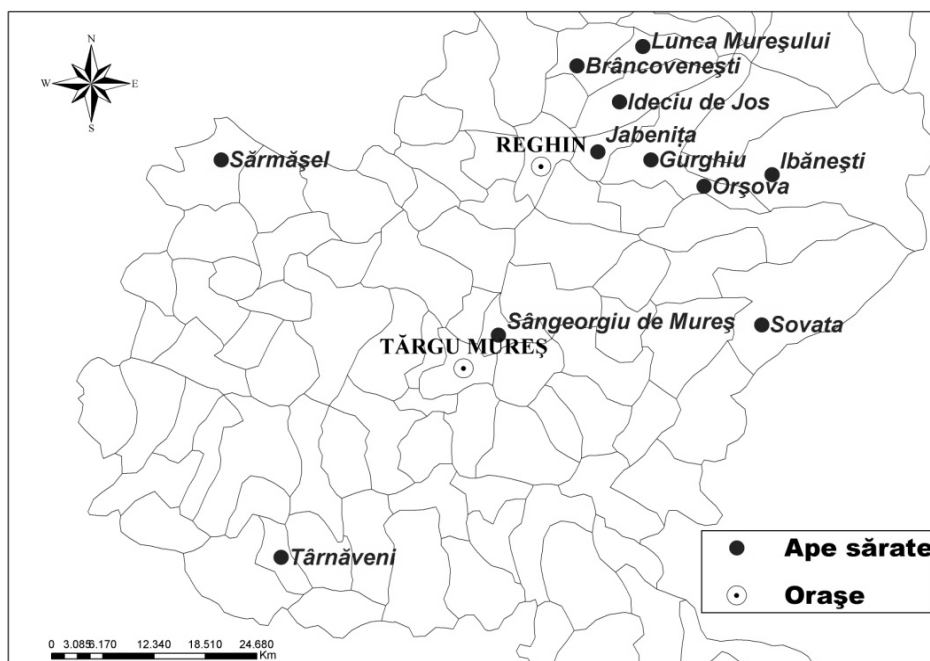


Fig. 1. Mureș County. Territorial distribution of salt waters

2. POSSIBILITIES FOR TOURIST CAPITALIZATION OF SODIUM CHLORIDE MINERAL RESOURCES IN MUREȘ COUNTY. CASE STUDIES: SOVATA AND TÂRNĂVENI

As regards the tourist exploitation of these hydrosaline resources, an analysis of the state in the old spa of Sovata is required, as well as from Târnăveni, a possible investment in the future which uses deep salt waters. Both are important towns in Mureș County, with a representative demographic and economic potential.

2.1. Case study: Sovata

Of the seven existing lakes, only one is artificial, Lacul Negru, the others being of natural origin, namely karstic saline lakes. The lakes are the following in order of their importance: Ursu, Aluniș, Verde, Roșu, Mierlei and Paraschiva. The latter category of lakes was formed on the place of some dolines, where salt dissolution and subsidence phenomena took place.



Fig.2. Sovata lacustrine complex

With the exception of Lacul Negru, the other karstic saline lakes are well arranged and duly included in the tourist circuit, both for visit and for bath, and their tourist potential is the best capitalized when comparing Sovata with the other settlements that have salt waters.

Thus, unlike other spas, the pressure of the large number of tourists is very high, so it was necessary to take some measures and interrupt baths for several hours during the day in Lacul Ursu.

A less efficient measure is to build twig-woven fences prone to destruction during the first downpour. As a more appropriate measure, a ditch should be built to collect fresh rainwater.

This way a clear distinction should be made between the two purposes: tourist capitalization, on the one hand, and protection of the existing hydrosaline resources, on the other hand.

Table 2. Morphometric elements of the salt lakes in Sovata
(according to M. Alexe, 2006)

Lake	Perimeter (m)	Area (m ²)	Maximum depth (m)	Average depth (m)	Length (m)	Volume (m ³)
Ursu	1223	41270	7.4	3.41	456	262470
Aluniș	256	3731	6.4	2.97	94	11070
Negru	245	3322	5.6	2.71	97	9002
Roșu	233	1406	2.1	0.83	92	1163
Verde	68	291	1.2	0.55	27	159
Mierlei	214	1462	1.85	0.9	84	1318

2.2. Case study: Târnăveni - Râioasa Spa

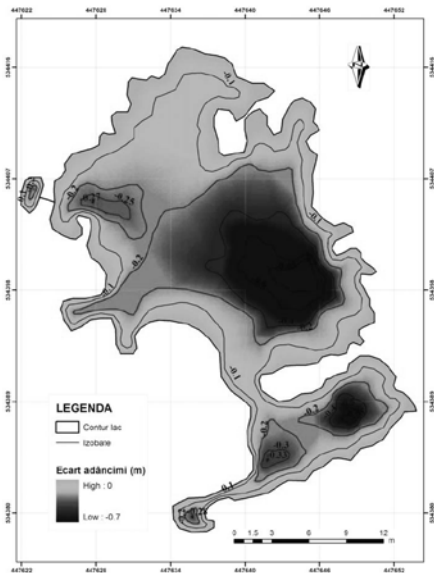


Fig. 3. Balta Alunei in Târnăveni
(according to Suciu D., Șerban Gh. and Toma Mirela).

The occurrence of sodium chloride mineral waters linked to an isolated diapir from this area located in the Târnavă Plateau represents a unique and special case. With a salinity oscillating between 10 g/L and 40 g/L, it is a naturally formed lake that has long been used for baths. Unfortunately, there is no current plan or project to develop tourist facilities in the near future.

The high value of spa potential in this area is also given by the black sapropelic mud, with good plasticity and high therapeutic quality similar to the mud in the lakes of Ocna Sibiului or Turda.

The idea to develop a site for baths must be well considered especially because the town has already a modern swimming pool and the Spa of Bazna is just 20 km away. However, in a first phase it is important that these salt water resources and mud to be protected and preserved for the future.

3. PROBLEMS RELATED TO THE PROTECTION OF EXISTING SODIUM CHLORIDE MINERAL WATER RESOURCES

Regarding the quality of salt waters, there are current physical phenomena with a negative impact that can cause significant changes in a short period such as clogging, desalination and disappearance of sodium chloride mineral water springs.

Recent field researches on salt water locations in Mureș County have frequently identified their ephemeral character; many springs appear and disappear because of rainfall regime and clogging.

Some measures such as lakeshore protection, heliothermic phenomenon protection and fountain construction in salt water sites can be considered insufficient to significant investments for the protection of these resources.

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