

## THE ANTHROPOGENIC IMPACTS ON THE ECSEDI-LÁP WETLAND

**Margit SZÚCSNÉ-MURGULY**

*Doctorands' Preparatory of University of Pécs, Hungary  
Pécs, Ifjúság útja 6*

**Abstract** The history of the region called Ecsedi-láp wetland was partly determined by tectonic movements and by the surface forming forces, such as the work of river-water in filling up the riverbeds, the destroying effects of floods, and the climatic influences. It was also determined by people's transformative role affecting nature and the region: the flooding of the surroundings of castles for defensive reasons, the effect of native economy in brooks by building watermills, land drainage work, and by digging of drains, inland draining channels, the effect of afforestation, and the construction of dams. Natural forces, geological conditions and human activities all played significant roles in the emergence of the wetland of Ecsed, but its devastation and soil alkalinisation (sodification) is definitely imputable to human action.

**Keywords:** Ecsedi-láp. Wetland, Floods, Szamos (Someş), Kraszna (Crasna), Nagykároly (Carei), River regularisation, Drainage, Alcalinization.

The wetland called Ecsedi-láp is situated in the eastern part of the Pannonian Basin, on both sides of the Hungarian-Romanian state border. The study of the humanization of this area raises some questions about the consequences of intervention into the natural processes, and indirectly, the problem of the sustainable development of the „peripheral” areas of both countries

### 1. FORMATION OF THE SZATMÁR PLAIN (CÂMPIA SĂTMARULUI)

The geological history of the Szatmár Plain began in Middle Miocene, when in the depth of this area, various Palaeozoic and Mesozoic trenches and ridges have been buried under Sarmatian and Pannonian deposits. According to borehole and geophysical data, a 300 m thick layer consisting of pyroclastics and lava flows covers the ancient metamorphic basement in the region of Nagyecséd (Frisnyák, 1984).

In the second phase of its evolution, the formation of the Alföld lowland begun together with the folding of the Carpathian flysh belt. Thus, during the late period of Miocene and in Pliocene, the sinking Pannonic Basin has filled up with 1000-2000 m thick brackish or fresh-water sediments, such as clay, marl and sand. In Pleistocene, the whole Alföld region become a large alluvial plain by the morphogenic actions of

Tisza (Tisa) and Szamos (Someş) rivers, and by the formation of wind-moved sand deposits (Frisnyák, 1984). 150-200 m thick fans were built up during the interglacial periods by the activity of the former Tisza and Szamos rivers in the eastern border of the Alföld. Finally, at the end of Pleistocene and in early Holocene, the extension of these alluvial fans stopped and in the marginal areas of the Pannonian Basin some shallow depressions were formed, among others, the Szatmár-Bereg lowland.

By transporting and depositing fine grained material during floods, the main rivers formed a specific morphology: 1-3,5 m thick longitudinal bars in both riversides, 2-3 km long „backs” between rivers (Szamoshát, Krasznahát) exempt of floods and various islands, as rests of the ancient alluvial fans, which have been then flanked by ponds and marshes — an ideal refuge for inhabitants in the hard times of XVI-XVII. Century (Farkas & Gaál, 1981).

## 2. FORMATION OF THE ECSEDI-LÁP WETLAND

The Ecsedi-láp wetland is the most young formation of the Szatmár Plain, not older, than 10000 years (early Holocene). During the *Coryllus* optimal climatic phase (5000-7000 years B.P.), the subsidence of the wetland area measured about 10 m. The marches have been filled up during the Atlantic phase (2500-5000 years B.P.) having the maximal extension in the Oak-period (2800-2500. B. Chr.). The permanence of the wetland have been assured by the floods of Szamos and Kraszna (Crasna) rivers. In its maximal extension, the Ecsedi-láp wetland was situated between the Szamos-hát (north and east), Nagykároly (Carei) Plain (south) and the Nyírség eolian sandy hills. The elevation of the „historic” wetland is 120 m in the south, 103 m at Olcsvaapáti and 97 m at Ecsed (Frisnyák, 1984).

The name of the wetland originates from the old locality Ecsed, situated at the northern border of the march. Szirmai, in 1809 mentioned it as *Lake Ecsed*. The wetland was considered as a „miracle of the nature”, the „*Lakusz Etsedensis*” being the most extended palustral (marchland) area in Middle-Europe (Karácsonyi & Ardelean, 2003).

The extension of the Ecsedi-láp has varied in time, in correlation with the meteorological conditions and the frequency of the floods. The first measurement (fig. 1.) was executed by land surveyor Sámuel Mikovinyi (1780), i.e. 58,5 km length and 33,5 km width. During the drought years of 1861-1865 period, the Ecsedi-láp has dried out completely, but in the following rainy period it has been filled with water again but then divided in two sub-basins: the Kis (small) and Nagy (big) March (Farkas & Németh, 1978).

Géza Czirbusz, teacher of the “Nagykároly” Secondary School, estimated the drained area in 1899 to 130-140,000 acres (1300-1400 km<sup>2</sup>), and the total surface of the wetland to 755-800 km<sup>2</sup>. Therefore, the basin of the march extends to 380-400 km<sup>2</sup> (Karácsonyi & Ardelean, 2003). Now, 2/3 of the old Ecsedi-láp is situated in Hungarian territory, 1/3 of the wetland in Romania.

## 3. THE SETTLEMENTS OF ECSEDI-LÁP

At the beginning of the Palaeolithic Age, various ethnic groups have settled

down in the area situated between Szamos, Kraszna rivers and Ecsedi-láp. This territory was populated in ancient times, as it was demonstrated by the archaeological finds. There were no extended settlements, only small villages and homesteads. However, despite of the scarcity of population, the settlements were continuous here (Dankó, 1994).

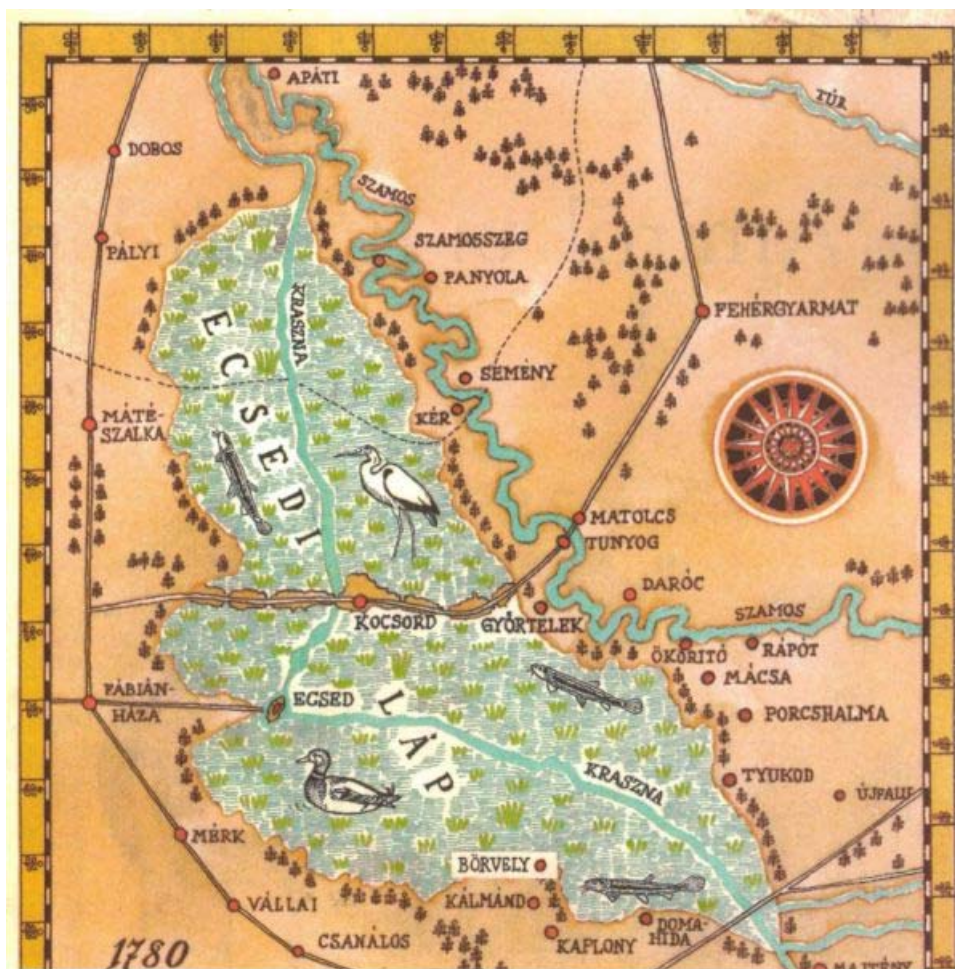


Fig. 1. The first map of Ecsedi-láp, edited in 1780 (after Farkas & Németh, 1978).

Inside of Ecsedi-láp no settlements existed. People owned only small islands near the borders of the march „using the opportunities of this great wetland for their subsistence” (Karácsonyi & Ardelean, 2003). I will list here the localities which were related directly to the Ecsedi-láp (Cservenyák, 1984):

In Hungary: Angyalos, Cégény, Csenger, Csengerújfalú, Fehérgyarmat, Fülöpös, Fülöpösdaróc, Géberjén, Ökörítő, Porcsalma, Tyukod, Tunyog, Györtelek, Kér, Kocsord, Nyírcsaholy, Nagyecsed, Nagydobos, Matolcs, Mérk, Mátészalka, Olcsva, Ópályi, Pátyod, Rápolt, Sályi, Szamoszeg, Vitka, Vásárosnamény, Vállaj, Ura;

In Romania: Börvely (Berveni), Kálmánd (Decebal), Kaplony (Coplean),



been built by Báthory lords, e.g. the Sárvár and the castle of Börvely (Berveni). They were surrounded by moats, which were inundated using the water of the natural ponds. Some localities were protected against floods by embankments and wood piles (Farkas, Gaál, 1981).

A few channels were dug from Szamos or Kraszna to the Ecsedi-láp, which served for powering a few water mills. In this way, an excess inflow were realised, which caused a slow, but continued extension of the wetlands' area.

Another cause of the increase of the wetland area was the so-called "progradation" („fok”) agricultural practice. During the floods, the banks of the main rivers were cut through, and the progradations („fok”-s), the neighbouring lower parts of the floodplain (i.e. the Ecsedi-láp) was put gradually under water, diminishing the damages of the flood. After flood, the fish in the „fok”-s was fished and consumed by riverin people, and in drought periods, the soil fertilized by alluvial mud was cultivated successfully. This practice was well known by inhabitants of some settlements as Szamosszeg (fig. 2.), Györtelek, Ópályi, Tótfalu and Komlódtótfalu.

During the drought period, when the Ecsedi-láp was dried, the wetland was ploughed, and sown, and many houses were built on the backs of the wetland. „Nice, white villages, churches with red towers”. The Ecsedi-láp, for short time, became populated. „But the water changed one's mind, returned to its place engulfed fields, gardens, white villages, churches with red towers”, Szirmay wrote, mentioning 14 settlements, which were disappeared under waves Farkas, 1982).

In same time, the localities as Ecsed, Bátor, Börvej advanced in their importance.

In the first decades of 17th's, under the impulse of repeated floods, the canalisation works begun. In 1730, viscount Ferenc Károlyi put to excavate three canals across the wetland, 31 km in length, and his son, Antal executed the canal which run parallel with the Kraszna river and begun the regularisation of Szamos river. However, this works were insufficient to stop the consequences of the great floods in 1870 and 1881. Thus, the drainage of the entire wetland became highly necessary.

In 1895, the Ecsedi-láp Draining Society Ltd was founded. In this year, the regularization of Kraszna river and its affluents begun; this difficult hydro-technical task, including 18 iron bridges was finalised in March, 1898. In few years, beside the regulation works, the Society resolved the problems of drainage and of inland water accumulations. In locality Ecsed, an electric power plant was installed, which assured the electricity for two uploading pumps.

By the regularization of Szamos river 22 curves were crosscut, at the same time with the construction of embankments and circular dams.

After pumping out the water, Ecsedi-láp become a fertile agricultural territory, but the unique wetland vegetation and wildlife disappear in short time. Birds did not find their breeding sites and fish population perished. Cutting the clumps and the roots of the reed, the inhabitants transformed the former march in arable land continuing this activities during the first decade of the 20. century. Later, shelter forest belts, lines of trees were planted, water reservoirs and ponds were excavated. Unfortunately, however, the productivity of soil decreased and in some cases the salinization (alkalisation) phenomena appeared.

After the great flood of 1970, the embankments of Upper Tisza river were reinforced and along the Szamos the so called big dam were built up. The flood of 2000 determined a new efforts of the Government and the hydro-technicians. The accentuated sedimentation in riverbed raised the question of whether higher dams or the revitalization of the older wetlands, such as Ecsedi-láp and other „fok”-s (see above) will have to be chosen, as with the latter alternative the nature-friendly agriculture must be combined with the preservation of original plant species and the aquatic wildlife. This problems raise the limits of the development of the peripheric regions, with scarce natural resources.

For this reason, the settlements of Ecsed area (Nagyecsed, Tiborszállás, Tyukod, Ura, Csenger, Berveni, Foeni) granted more than 700,000 €, for rehabilitation of 700 ha wetland in the region of the former Ecsedi-láp.

## 5. CONCLUSIONS

The history of the Ecsedi-láp wetland was determined either by geological (tectonic) movements, the surface forming activity of the rivers, the meteorological factors and the human activity. The human intervention consisted of construction of moats, of the watermills, and later the excavation of canals and drainage works which were exempt of inundations and caused the wetland to vanish. Now, the decreasing agricultural efficiency and the management problems of the great floods of the Szamos and Kraszna river raised the problem of the nature-friendly agriculture and the revitalization of a part of the wetland.

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