

## Sinevir Lake - geotouristic and naturalistic gem of Transcarpathia

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### ABSTRACT

About ten thousand years ago, a landslide closed small mountain valley in Horhany Mts. – part of the Eastern Carpathians (Transcarpathian region, Ukraine), creating thus a picturesque and interesting object – Sinevir Lake. Surroundings of the lake, typical by almost untouched natural environment, were declared for National Park. This area is worth visiting from geotouristic and/or naturalistic point of view.

**Keywords:** Eastern Carpathians, flysch belt, Horhany Mts., Sinevir Lake, Sinevir National Park, geology, fauna and flora, geotourism, green tourism

### INTRODUCTION

Being the primary and direct factors, the geological development of the area and its result - geological structure, together with climatic conditions (=climate) affect the relief of the area (its segmentation, hypsometry, forms and their orientation, etc.) and its hydrographic characteristics (density and character of water courses and water bodies). Geological characteristics of the area partially or implicitly affect the localization of phytocenoses and zoocenoses in the area. The formation of Sinevir Lake and characteristics of the lake and its surroundings would be a good example of these relationships.

Banks of creeks and rivers, barriers in their courses (cascades, cataracts, waterfalls) and deeply cut valleys often represent picturesque and dynamic sceneries, which bring pleasure to tourists and/or naturalists. Lakes - reservoirs of stagnating or slowly flowing water with their fronts and immediate environs, have rather tranquilizing and relaxing effect on visitors. Rivers and lakes are „boiling with life“, which is of interest for naturalists and/or nature lovers and geomorphologic forms of river beds and valleys or lake basins are interesting for geologists and/or

geotourists. There are 32 natural lakes in the Eastern Carpathians of the Transcarpathia region. The Sinevir Lake is the largest, best known and most visited. This lake attracts tourists by its modest and quiet beauty, by its location in untouched forest area and by compelling scenery of the surroundings Eastern Carpathian Mts.

### LOCATION AND CHARACTERISTICS OF THE SINEVIR LAKE

Sinevir Lake is situated in the height of 989 m a.s.l. in the northeastern part of the Mižhyrja district on the northern slope of Ozirna Mt. (1. 459,9 m a.s.l.) or rather between Ozirna Mt. and flat anticline with an elevation 1.066 m a.s.l. (See Fig. 1). Geographical co-ordinates of its eastern peaks and of the natural dam (barrier) of the lake are: latitude  $\varphi = 48^{\circ} 37' 5''$  N; longitude  $\lambda = 23^{\circ} 41' 18''$  E (Kuchař, 1938). Sinevir Lake has a shape of irregular quadrangle (see Fig. 2a); a few nonexpressive forelands create non-expressive embayment in the western part. A small island with an area of only a few tens square meters, reminding an eye pupil, is situated in the center of the lake. The

surface of the lake fluctuates between 7 and 8 hectares depending on the water-table level. Lake consists of two basins, which are separated by underwater barrier – the northern one is 22 m and the southern one 19,5 m deep. Water depth on the barrier reaches from 11 m to 1,5 m (see Fig. 2b). Average water depth is about 8.2 m; only 10% of the lake area exceeds over 15 m. Water cubature in the lake reaches maximally 400. 000 m<sup>3</sup>. Average air temperature at the lake in January reaches from – 5 to – 9 °C, in July from +5 to + 8 °C. The amount of precipitates in the surroundings of lake is at least 1.200 mm a year. Steep or almost vertical fronts are overgrown by old spruces and firs (Gribov and Njorba, 2008).

People living in the surroundings of the Sinevir Lake explained its formation in the following legend: “Once upon a time, many years ago, when all around, including the deep forest, belonged to a mighty count, who had a very nice daughter – blue-eyed Syn? She was adult and many men wooed her, but nobody gained her heart. One day the count was leaving his castle to visit the distant forests and see how his lumbermen

are working. Syn begged her father to go with him and he finally agreed. When they arrived to the place, father controlled lumbermen’s work and Syn went for a walk. She went quite deep into the woods, when suddenly, she heard a very nice melody, played by a reed pipe. Syn followed the sound of pipe and came to a forest meadow, where she found a young shepherd with his herd of sheep and goats, playing a reed pipe. Syn asked him what his name was, and he introduced himself as Vir. Syn listened to him for a long while and later requested Vir to bring her back to her father. As they bid goodbye, Syn promised, that she would come again. And she came again ... and again ...and more often... They both fell in love. Her father learnt, that his daughter was meeting a young shepherd and became very angry. He forbade Syn to meet Vir, but she continued meeting him in secret. He decided to get rid of her daughter’s wooer. His servants killed Vir and buried him in the woods, where he waited for Syn. Syn came and found big stone instead of Vir. She realized, what had happened and started to cry bitterly. She cried for such a long time, that her tears

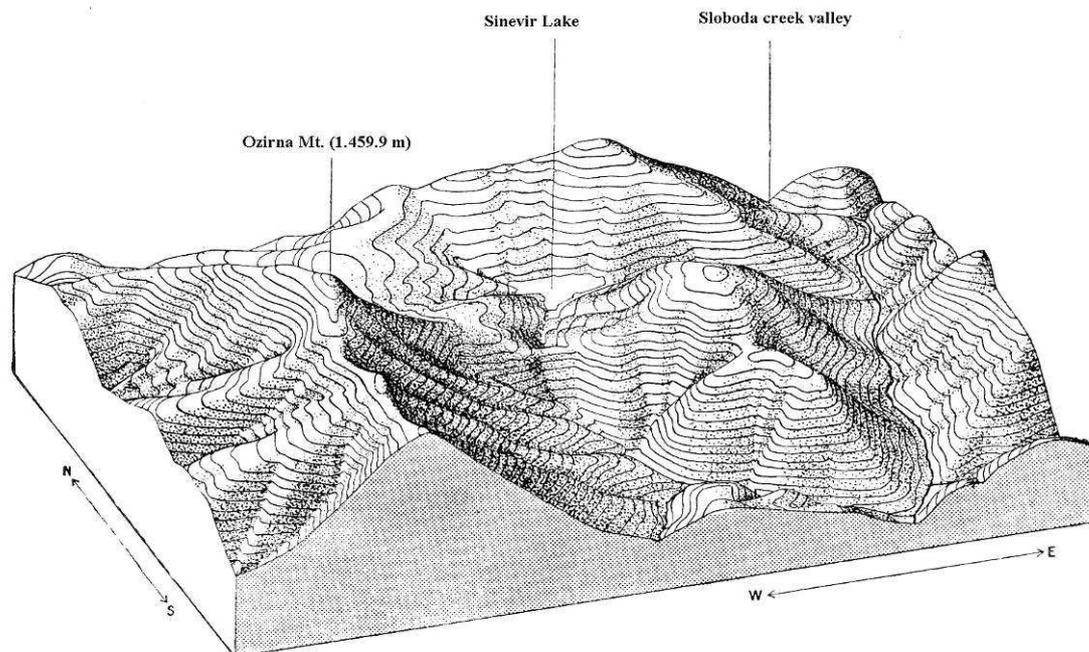
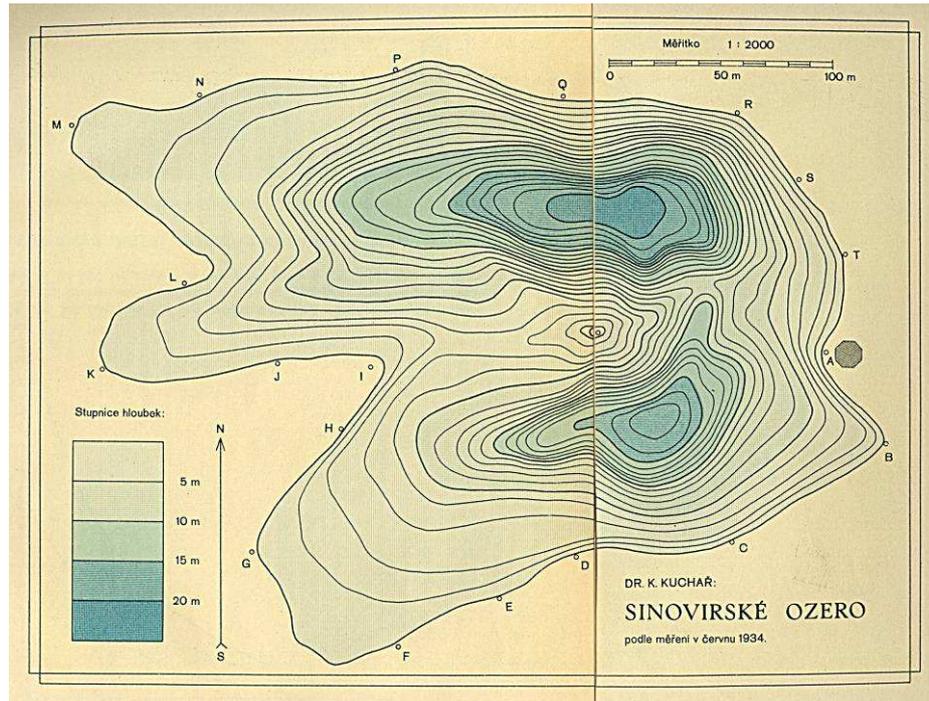
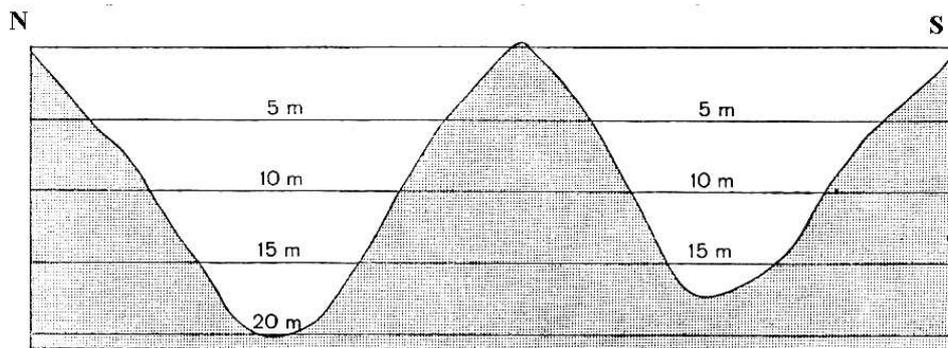


Fig. 1 Blockdiagramme of the Sinevir Lake’s surroundings (From: Kuchař, 1938)

A



B



**Fig. 2A** - Map of the Sinevir Lake, **B** - Profile of the lakebed (From: Kuchař, 1938) (Descriptions: Měřítko – Scale, Stupnice hloubek – Scale of depths, podle měření v červnu 1934 – according to field survey of July, 1934)

created a lake, and only the Vir's grave remained above the water as a small island. Syn disappeared in the lake, which had the color of her eyes. In memory of their love, people named the lake Syn-i Vir.“

A wooden sculptural group, created in 1983 – 1984 by Transcarpathian artists Ivan Brody and Mikhail Sanych, placed on a small peninsula in Sinevir Lake, reminds of this legend to this day. This sculptural group (see Fig. 3) was carved from wood of European Larch; it is 13 m high and its weight is about 30 t (Gribov and Njorba, l.c.).

## GEOLOGICAL STRUCTURE AND GEOMORPHOLOGY OF THE SINEVIR LAKE SURROUNDINGS

Geologists estimate, according to the amount of sediments accumulated in the lake, that Sinevir Lake is relatively young – it originated about 10.000 years ago (Kuchař, 1938). Few theories were presented about its origin. As Sinevir Lake is situated in a region of the Outer Eastern Carpathian (= outer flysch) in so called Krosno zone, there are following possibilities of its origin: (1) glacial lake

(mountain tarn or drift-dammed lake) or (2) landslide lake.

However, mountain relief surroundings the lake does not bear any signs of glacier activity. The reason is as follows: according to geological knowledge the snowline level during latest ice ages reached down to 1.500 to 1.600 m in the Eastern Carpathians. And because only a small part of region in the Sinevir lake

area reaches such heights, it is hardly probable, that any glaciers were present here (Vitásek, in Kuchař, l.c.). Glacial relief forms are present in the Eastern Carpathians only on polonina (= flat meadow mountain range) Čorna hora, where highest peaks of Transcarpathian and even Ukrainian mountains (Hoverla 2.061 m a.s.l., Pop Ivan - 2.025 m a.s.l., Pietroš - 2.020 m a.s.l.) are located.



**Fig. 3** Sculptural group of Syn and Vir at the Sinevir Lake; **Photo by:** Lanskiĵ, 2009

Surroundings of Sinevir Lake are built by flysch Eocene (sandstones, clayey slates, aleurites) and Paleocene (sandstones, gravelites, conglomerates, clayey slates) formations (according Kulchickij, 1974, in Gabinet et al., 1976). Therefore, the second possibility of Sinevir lake originating by a landslide is much more probable - and nowadays almost generally accepted. Landslide, which had dis severed from the northern slope of the spot height 1.139 m had blocked a creek valley. A broad stony wall (= divisional plain) of the landslide is there visible on the slope. Already Czirbusz (1900, in Kuchař, l.c.) presented the above-mentioned opinion. According to morphology of divisional plane and dam (barrier), it seems that landslide was a one-time and abrupt occurrence, caused by a tectonic predisposition and by an earthquake. As a result, a dam that closed the narrow valley arose crosswise to the creek current. Landslide accumulation is about 400 m long, about 250 m wide and up to 38 m thick; it covers about 60.000 m<sup>2</sup> and contains about 847.000 m<sup>3</sup> of debris (Gribov and Njorba, l.c.).

## HYDROLOGY AND BIOLOGY OF THE LAKE

Sinevir Lake is fed by 4 small (no name) creeks and also by some water springs on the lakebed. Water is water – so after some time it found its way out through the bedrock (below landslide accumulation) and lake became flow-through. However, the outflow from lake is hidden - about 60 m from SE lakefront a small creek appears from below debris. Few years ago a stony portal was built here (Brandos – Kleslo et al., 2007). After 1.200 m this creek flows into the Tereblja River, which originates about 1.000 m higher by a confluence of Krasnyj (red) Zvor and Sloboda Creeks. Water table of Sinevir Lake fluctuates depending on the amount of atmospherical precipitates – these oscillations reach up to 3 m. Wooded mountain slopes from all sides surround Sinevir Lake and the surface of the lake is therefore only scarcely warped by wind gusts. Water level is smooth as a plate of glass or covered only with tiny waves and it mirrors circumjacent forests (See Fig. 4).



Fig. 4 Sinevir Lake mirroring circumjacent forests, in the center small island; Photo by: Lanski, 2009

Surface water layer is stabile, or circles round according to the wind. Water is clear and it contains a lot of oxygen, providing very good conditions for an exuberant life. During sunny summer days it is warmed up to 20 °C and because it does not mix, it is step-by-step cooler downwards down to + 4 to + 5 °C. Lake bottom is stony, locally loamy and lakefronts are often muddy (Gribov and Njorba, l.c.).

Dense scrubs of curly pondweed (*Potamogeton crispus*) grow near the influxes of creeks into the lake in the depth of about 1 to 1.5 m; for a long time it was being used as fertilizer. Abundant scrubs of the water chestnut (*Trapa natans*) are present on the open water surface. This plant floats partially on the surface and partially under the water surface – a wide rosette of leaves with a flower and fruit occurs on the surface, long footstalks with narrow leaves float in the depth of the water. Fruits of water chestnut are four-cornered hard „nuts“ with four thorns, containing core – a nut. Raw nuts are mildly poisonous, but they are edible after roasting or boiling (see Fig. 5). Big amounts of various unicellular organisms (protozoan, algae, etc.) are present due to crystal clear water and high oxygen content in the water and on the lake bottom. Various mollusks, sedge flies and horseleeches' larvae live on the bottom. Green alga *Cladophora glomerata* (so called „frog-hair“) is also very abundant.

Two fish species are present in the lake: lake brown trout (*Salmo trutta m. lacustris*) and brook minnow (*Phoxinus phoxinus*). Lake trout differs from the river brown trout by its greater length and by its weight (its mass can reach 6 kg, exceptionally up to 30 kg), but also by greater fertility. Brook minnow is a small (grows up to 9 cm, rarely up to 13 cm) multicolored fish (see Fig. 6), which lives in lake in big schools. These schools swim along the lake front searching for food, during spawning time they create spherical schools (see Fig. 7). Spawn and embryo of minnows and also minnows themselves are an important food

source for predatory trouts.

## SINEVIR NATIONAL PARK (NP)

The existence of unique Sinevir Lake in almost untouched natural environment was a reason for declaration of the Sinevir Lake Natural Reserve in 1974, and in 1989 it was reclassified to Sinevir National Park. The goal of nature protection in Sinevir NP is: „preservation of particularly valuable natural complexes of the Eastern Carpathians, promotion of eco-friendly approach to natural resources utilization and also monitoring and control of recreational-touristic activities in the area.“ Sinevir Lake has, in addition to its exceptional aesthetical value, an enormous importance as an example of protected lacustrine-sylvan biotope. A water protection zone with the area 1.000 ha is situated around the lake (Gribov and Njorba, l.c.). Area of the Sinevir National park spreads across 40.400 ha, 5.807 ha of it are reserves (See Fig. 8). Some of the most interesting objects of nature protection are vanishing lake – peat bog Ozirce, peat bogs Gluchanja and Zamshatka, localities Kantina, Pessja and Kvasovec, where a spring of low-mineralized (hydrocarbon ate-chloride sodium) mineral water can be found. Gluchanja, high moor with its convex surface, is vanishing step-by-step due to growth of 15 kinds of plants, e.g. small cranberry (*Vaccinium microcarpum*), rannoch-rush (*Scheuzeria palustris*), water soldier (*Stratiotes aloides*), small-flowered sedge (*Carex parviflora*), marsh clubmoos (*Lycopodiella inundata*) and others. Small lake of Ozirce is a great example of a mountain-lake-into-peat-bog turnover. This lake is situated about 1.000 m a.s.l.; lake extent is 1.2 ha and its depth reaches up to 10 m. Water temperature during summer reaches approximately 15 °C, in winter time, it is frozen. Water is colored due to peat cinnamon, and despite of this, trouts live there. Ozirce is overgrowing



Fig. 5 Water chestnut - *Trapa natans*; Source: [www.biolib.de](http://www.biolib.de)

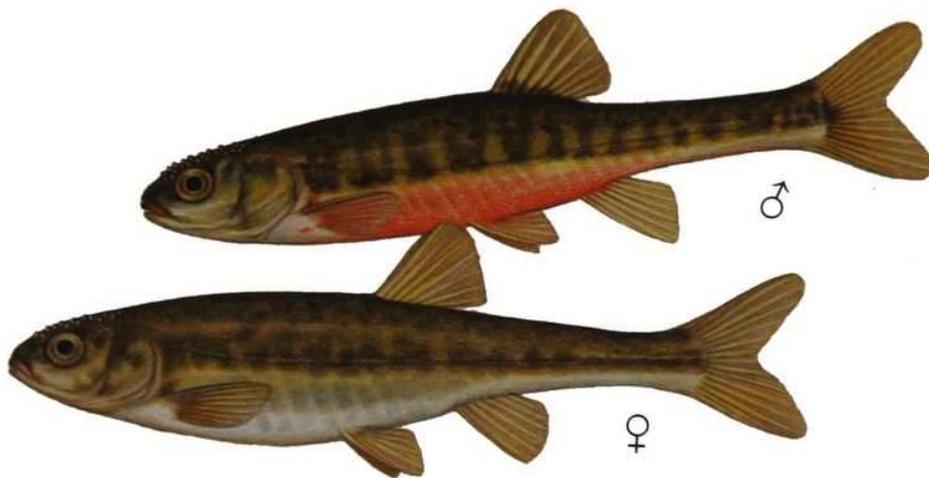


Fig. 6 Brook minnow - *Phoxinus phoxinus*; Source: [www.slaviaryby.sk/fotogaleria/albums/ryby](http://www.slaviaryby.sk/fotogaleria/albums/ryby)



**Fig. 7** Spherical schools of brook minnows; **Photo by:** Lanskiy, 2009

from its margins and also from center at the same time: growths of peat moss (*Sphagnum palustris*) and small-flowered sedge (*Carex parviflora*) rise from the lakefront, reddish-brown pads of peat moss with livid flowers and red fruits of small cranberry rise from the center (Gribov and Njorba, l.c.).

Botanical world of the Sinevir National Park is very diverse – spruce and beech forests take turns with meadows, covered with common and rare species of herbs. Local climatic conditions are optimal for spruce forests, which cover the greatest part of the area. Ninety-four species of scarce and rare plants were registered in the Sinevir NP, of which thirty-eight are inscribed into the Red book of Ukraine. There are many tourist trails, riding and cycling routes in the Sinevir NP area, ecological and educational-cognitive trails, several recreational facilities, skiing and

sleighting routes were also created here. Green tourism and agrotourism are developed here. There is a world unique Museum of Forestry and Rafting in the Ozirjanka (also called Black River) valley, which was heavily damaged by „centennial water“ floods in 1998 (Brandos – Kleslo, et al., 2007). Traditional and historical instruments of lumbermen and raftsmen (here called „bokorashi“) are presented in this museum (See Fig. 9).

## CONCLUSION

Sinevir Lake and its surroundings represent an example of Eastern Carpathian nature, which is minimally influenced by men. A visit of the lake gives the visitor not only a deep aesthetic experience, moreover, for people interested in nature it could also offer an interesting experience from getting



Fig. 8 Map of the Sinevir National Park; Source: Карпати. – Tourist map

to know interesting geology and/or rare species of Carpathian nature. If you want to keep this experience for your whole life, you should also climb up Ozirna Mt. (1.495,9 m a.s.l., duration 2 to 3 hours), or even climb onto the summit of Vyshkivskij Horhan Mt. (1.439 m a.s.l., duration 5 to 7 hours) (See fig. 10). Vyshkivskij Horhan is

situated on the main edge of Horhany Mts., along which ran the frontier with Poland during the time of so-called First Czechoslovak Republic (today frontier of Transcarpathian and Ivanofrankivsk region – „oblast“). Both of these summits are the perfect spot for observing the beauty of Transcarpathian Polonins.



**Fig. 9** Museum of Forestry and Rafting after a big flood in 1998; **Photo by:** D. Lanski, 2009



**Fig. 10** Look from Ozirna Mt. to the Sloboda creek valley; **Photo by:** D. Lanski, 2009

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