



Gold-bearing potential of the alluvium in the Luda Yana and Topolnitsa Rivers' catchment basins

Златоносност на алувиалните наслаги във водосборите на р. Луда Яна и р. Тополница

Gergana Bakalova
Гергана Бакалова

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Object of the current research are Luda Yana and Topolnitsa rivers' catchment basins. Subject of the current research is the spread of massive gold, its explored alluvial placers, the ore deposits, the contemporary alluvium and the ballasts. The goal of the current research is tracing the suitability of the ballasts for breasting of placer gold as well as the factors determining the appearance of the gold-bearing alluvium. The data used are from geological and geomorphological reports and publications.

The Luda Yana and Topolnitsa rivers are tributaries of the Maritsa River, which flows into the Aegean Sea.

The catchment basins of Luda Yana and Topolnitsa (except for the catchment basin of its main tributary – the Muti Vir) rivers are part of the Panagyurishte–Etropole ore district. In terms of size, the Muti Vir River's catchment basin is relatively broad. It is directly situated to the west of the Panagyurishte–Etropole ore district – in the Ihtiman area, where the mineralization is of a different type – veins. Therefore, we will formally separate it from the Topolnitsa River's catchment basin and will examine it on its own terms.

Gold-bearing Capacity of the Catchment basins

The Luda Yana River's catchment basin is the main gold-bearing, followed by the Topolnitsa River's one. In the first basin, placer gold is found in a large part of the valleys, whereas in the second basin, mainly the left tributaries and just a small part of the right ones are gold-bearing. In the Muti Vir's catchment basin, only a few valleys are gold-bearing.

Valley-bed alluvium

The valleys of the Luda Yana, Topolnitsa and Muti Vir rivers consist of alternating widenings and nar-

rowings, varying in width from 10-20 m up to hundreds of meters and even few kilometers. Along all the courses of the rivers, alluvium covers the beds of the valleys and we can distinguish up to several low alluvial terraces. Such terraces could also be found in the middle and lower courses of some of the major tributaries. The thickness of valley-bed alluvium is between 10 and 15 m. Its granulometric composition varies within the sand-gravel fraction range, with or without the presence of boulders.

Explored reserves

We have three of those. One is in the lower course of the Luda Yana River. The other two are located in the lower and upper course of the Topolnitsa River, respectively. The explored reserves contain gold whose quantity is not enough for mining, but is sufficient for breasting.

Ballasts and their suitability for gold breasting

Only sands and gravels have been extracted from all the ballasts in the explored region. There are three ballasts along the course of the Luda Yana River. One of them is in the lower course of the river, within the explored alluvial placer. The other two are located in the middle course of the river. Considering the data for the explored alluvial placer and for the gold-bearing capacity of the Luda Yana River's catchment basin, all of three ballasts are highly suitable for gold breasting.

In the lower course of Topolnitsa River, there are four ballasts. Three of them are located within the explored alluvial placer which has data pointing to high suitability for gold breasting. The fourth ballast is near the river mouth, where the influence of the Maritsa River is strongly felt. Therefore, that ballast is of low to average suitability. In the upper course

of the river, where it is not highly gold-bearing, there is just one ballast which is of average suitability for gold breasting.

Along the Muti Vir River, there are four ballasts, three of them lying right next to each other. The three are situated immediately above a kettle widening and in the valleys above them there is a localized section containing placer gold. This indicates that the three ballasts might be considered as suitable for gold breasting, even if as a whole, the Muti Vir River's catchment basin might be of low suitability. The fourth ballast lays in a kettle widening. Here, the valley of the river is about 2 km wide, which puts this ballast as one of low suitability.

Factors which determine the forming of the gold-bearing alluvium

The ore deposits and occurrences (mostly porphyry copper and epithermal copper) as well as their corresponding hydrothermal altered rocks in the Panagyrishte–Etropole ore district are the main factor for the widespread gold-bearing alluvium in the Luda Yana River's catchment basin and a part of the Topolnitsa River's catchment basin. The Asarel, Petelovo and Radka deposits (among which the Petelovo deposit stands out as the most gold-bearing) are direct sources of gold. However, the connection between the gold-bearing capacity of the direct source and of the alluvium doesn't always exist. The

Chelopech, Vozdol and Karlievo deposits, being known as highly gold-bearing (especially the Chelopech deposit), do not feed the river valley network with placer gold. The reason for that is the high dispersion of gold in those deposits.

The gold in the Luda Yana and Topolnitsa rivers' catchment basins is also deposited due to the re-sedimentation of Neogene and Pleistocene breccia-conglomerates and sandstones, containing single grains of gold and thus these sedimentary rocks are an intermediate source of the gold.

The mostly mountainous character of the region is a clear indication for a tendency towards uplifting during the neotectonic stage of its development. The predominant part of the valley slopes has a step-like convex shape. That points to alternating periods of intense raising-up and such of relative tectonic stability. This cyclic process leads to a systematic destruction of the direct and intermediate sources and transporting of the released gold into the valley beds.

Conclusions

The non-uniform distribution of both ore deposits and occurrences and their corresponding hydrothermal altered rocks as well as the non-uniform distribution of the intermediate sources is the main reason for appearance of the non-uniform gold-bearing alluvium. This determines the different suitability of the ballasts for gold breasting.