

Fauna of a Large Early Middle Miocene Lake of Serbia

Nadežda KRSTIĆ, Slobodan KNEŽEVIĆ & Sanja PAVIĆ

At the beginning of the Middle Miocene the Vardar Composite Terrane sunk together with Serbian-Macedonian CT, giving the room for creation of a large lacustrine system. The type of sediment and fauna indicate a single lacustrine system. This large basin (Fig. 1) was filled by nearly freshwater during the Lower Badenian. At the beginning of the Middle Badenian, the connection with the marine realm was established and the lake turned into a gulf. The name Serbian Lake was introduced by KRSTIĆ & KOMARNICKI (1996).

The lacustrine part of the sedimentation cycle, lying conformably below the Middle Badenian, belongs to the Lower Badenian. On the basis of fossil macroflora (PANTIĆ 1962), molluscs (STEVANOVIĆ 1977; KNEŽEVIĆ 1996) and vertebrates (PETRONIJEVIĆ 1967; PAVLOVIĆ 1981) the age of the marl was determined as Middle Miocene – equivalents of the Badenian (STEVANOVIĆ 1977). Based on the fossil flora it was placed into the “Helvetian”. The age of the Kragujevac Neogene was determined as “Tortonian” (GAGIĆ 1972). Well before this PAVLOVIĆ (1901) concludes that “Melanopsis Marl and the related strata [...] are older than it was previously considered, its age is the Miocene and [...], they are equivalents of the Second Mediterranean stage”, the Badenian.

The malacological investigation started with the determination of BRUSINA (1894, 1902: *Ancylus serbicus*, *A. dimici*, *Planorbis pavlovici*, *Prososthenia serbica*) and PAVLOVIĆ (1903: *Prososthenia fuchsi*, *Melanopsis petkovici* and others). Still we are not far from its initial phase in spite of excellent monograph of V. MILOŠEVIĆ (unpubl.) dealing with the Peć surroundings, a branch of Serbian Lake containing PAVLOVIĆ's (1933) species *Hydrobia santrici*, *Bythinella cvijici*, *Micromelania proni*, *M. metohiana*, *Kosovia praepontica*, *Gyraulus decani*. STEVANOVIĆ (1985) determined to the north of it *Radix cobeltiformis*, *R. levasi*, *Fossarulus praeponticus*, *Marticia macarii*. Investigation of KNEŽEVIĆ (1982, 1991) completed the picture enlarging the areas of some species, being connected to different facies – with *Congeria nisseana*, *C. cvitanovici servica*, *C. antecroatica sumadica*, *Kosovia matejici*, *Micromelania proni* and many more. Anyhow, there are many of unsolved taxonomic questions.

There is not much investigation on ostracode meiofauna. New species of the freshwater genera have been described from different localities. Single monospecific association is the one of *Amplocypris snegotini*.

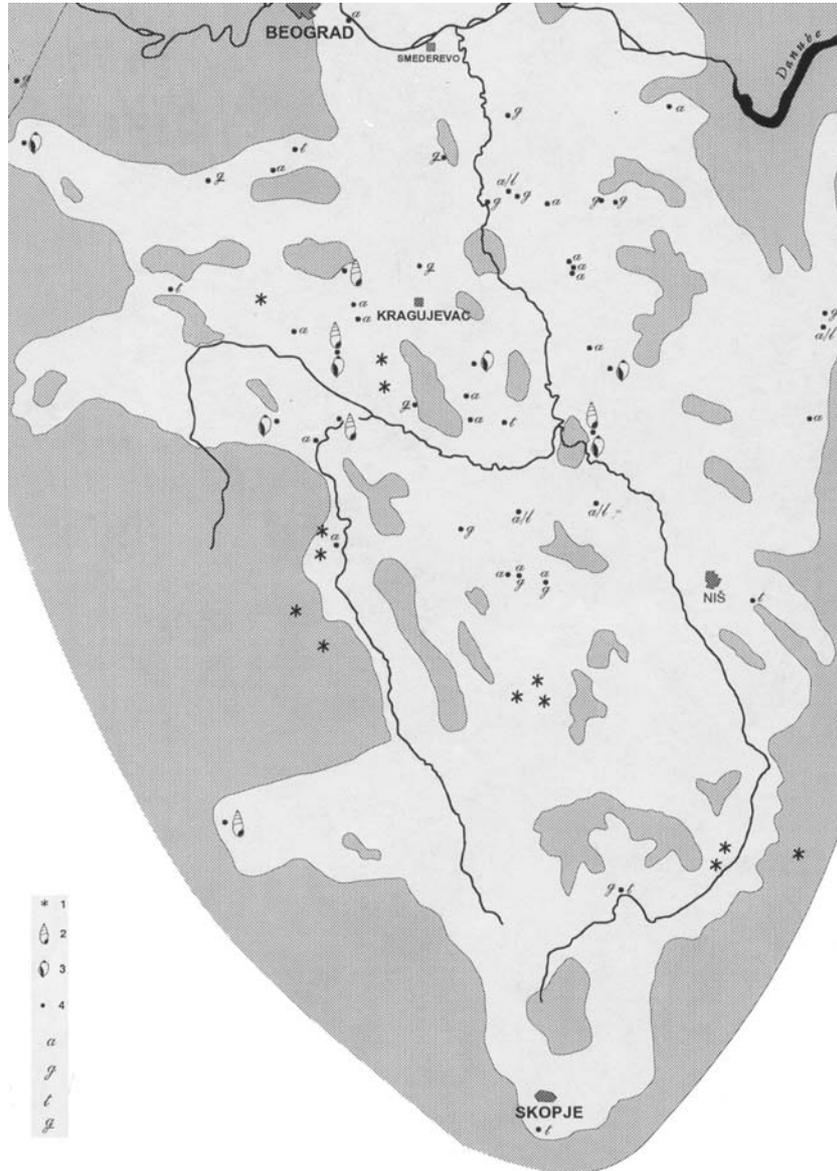


Fig. 1: Extend of the Serbian Lake in Serbia and northern Macedonia (without SW Bulgaria prolongation). Legend: 1) Contemporary volcanoes. 2) *Prososthenia* sites. 3) *Kosovia* sites. 4) Proboscidean sites: g - *Deinotherium giganteum*, a - *Anancus arvernensis*, a/l - *Mastodon angustidens/longirostris*, t - *Zygodolophodon turicensis*.

The community from sandy facies of Donja Mutnica contains large *Candona bouei*, *Herpetocypris miocenica*, smaller *Ilyocypris pannonica*, *Candona mutnicae*, *Pseudocandona miocenica*, *Dinarocythere costata* and small *Potamocypris bouei* and *Cypriidopsis pannonica* species (KRSTIĆ 1972). The last one was determined as "*Cheikella*" by GAGIĆ (1972) due to smaller and larger hump on some specimens. Few species from marly sediments *Ohrididela sabante*, "*Reticulacandona*" *baljkovacensis* (KRSTIĆ 1974) are widespread. The species *Mediocypris nisseana* extends from Belgrade to Niš. Mentioned new species has been repeatedly spotted recently. There is a tight relation, geological and geographical, between all the quoted localities and they are of the same age. Same meiofauna of such type has also been collected later (KRSTIĆ et al. 1997).

Proboscidean remnants are most widespread along the whole realm of Serbian Lake. Maybe because they are large enough and curiously shaped to be noticed as important. There are remnants of following species: *Deinotherium giganteum*, transition of *Mastodon angustidens* toward *M. longirostris*, *Anancus arvernensis* and *Zygalophodon turicensis*. Mastodonts of Serbia were revided by PAVLOVIĆ (1981).

Conclusion: The main molluscs in the Serbian Lake are *Congerina*, *Kosovia* and ornamented *Prososthenia* indicating some salinity of the lacustrine water. Only *Kosovia* is not found yet in the eastern parts of the Lake. The same is valid for the ostracode genera *Mediocypris* and *Dinarocythere*, which are absent from eastern parts of the lake. Does it mean that the water was less saline there? Or is the reason that the upper parts of lacustrine column, bearing autochthonous fossils, were washed of? Most of collected proboscideans indicate a younger age, especially *D. giganteum*, but its ancestor *D. aff. giganteum* appeared earlier, together with *A. arvernensis* and *M. angustidens/ longirostris*. There is need of the micro-mammal study in sites with proboscideans.

References

- BRUSINA, S. (1894): Zvezdan (Planorbis Pavlovići Brusina und *Ancilus serbicus* Brusina). – Annales Geologiques de la Peninsule Balkanique, 5(1): 193-199, Beograd.
- BRUSINA, S. (1897): Materiaux pour la faune malacologique neogene de la Dalmatie, de la Croatie et de la Slavonie avec les especes de la Bosnie, de l'Herzegovinae et de la Serbie. – Djela Jugoslavenske akademije znanosti i umjetnosti, 18: 1-43, Zagreb.
- BRUSINA, S. (1902): Iconographia Molluscorum fossilium in telure Tertiaria Hungariae, Croatiae, Slavoniae, Dalmatiae, Bosniae, Herzegovinae, Serbiae et Bulgariae inventorum. – Operis "Gradja" per alteris, Atlas: 1-10, Zagreb.
- GAGIĆ, N. (1972): Representatives of *Cheikella* (Ostracoda) from the Neogene sediments of Kraljevo and Kragujevac. – Annales Geologiques de la Peninsule Balkanique, 37: 157-164, Beograd.

- KNEŽEVIĆ, S. (1982): Lacustrine Neogene of the Levač basin. – 115 p., Thesis, Mining-geological faculty, Beograd.
- KNEŽEVIĆ, S. (1991): Regional-geologic characteristics of the Neogene of the Varovnica and surrounding area. – 182 p., PhD. Thesis., Mining-geological faculty, Beograd.
- KNEŽEVIĆ, S. (1996): New *Congerina* from Šumadija and Pomoravlje. – Neogene of Central Serbia. IGCP project 329 "Neogene of the Paratethys", Yugoslav Working Group, Special publication of Geoinstitute, 19: 27-31, Beograd.
- KRSTIĆ, N. (1972): Neue Ostrakoden aus dem Obermiozän von Donja Mutnica (Paraćin, Serbien). – Bulletin scientifique, Conseil des Académies de la RSF de Yougoslavie, Section A, 17: 5-6, Zagreb.
- KRSTIĆ, N. (1974): Ostracodes of the Miocene of Baljkovac, Kragujevac. – Comptes rendus des séances de la Société Serbe de Géologie, 1973: 177-188, Beograd.
- KRSTIĆ, N. & KOMARNICKI, S. (1996): Maximal spreading of the Serbian Lake (possible of the Lower Badenian age). – IGCP project 329 & 343, Materials of Symposium "Neogene stratigraphy and paleontology of Kerch and Taman peninsulas", 18-19, Moscow/Krasnodar/Anapa.
- KRSTIĆ, N., BOJIĆ, Z., VULETOVIĆ, V. & KERANOVIĆ, V. (1997): Lacustrine Miocene in Dragčiči near Kraljevo. – IGCP project 329 "Neogene of the Paratethys", Yugoslav Working Group, Special publication of Geoinstitute, 21: 127-138, Beograd.
- PAVLOVIĆ, M. (1981): A Contribution to the Nomenclature on Fossil Proboscideans of Serbia. – Annales Geologiques de la Peninsule Balkanique, 45: 187-202, Beograd.
- PAVLOVIĆ, P. (1901): On Melanopsidae marl and related sediments on the Balkan Peninsula. – Prosvetni Glasnik, 22: 449-458, 570-576, Beograd.
- PAVLOVIC, P. (1903): Zwei neue Arten aus Zvezdan und Madjare. – Annales Geologiques de la Peninsule Balkanique, 6(1): 324-325, 293-325, Beograd.
- PAVLOVIC, P. (1933): O fosilnoj fauni mekušaca iz okoline Peći (Über fossile Fauna aus Peć Umgebung). – Glas SKA [Nachrichten der serbischen königlichen Akademie], 78: 76-91, Beograd.
- PETRONJEVIĆ, Z.M. (1967): Die mittelmiozäne und untersarmatische (steirische) Säugetierfauna Serbiens. – Palaeontologica jugoslavica, 7: 1-157, Zagreb.
- STEVANOVIĆ, P. (1977): Kenozoik [in Serbian]. – Geology of Serbia, II(3): 1-443, Mining-geological faculty, Beograd.

Authors address:

Nadežda Krstić & Sanja Pavić
 Natural History Museum
 Njegoseva 51
 SRB-11000 Beograd
 n_krstic@ptt.yu

Slobodan Knežević
 University of Beograd
 Faculty of Mine and Geology
 Djusina 7
 SRB-11000 Beograd