

Change of shell of the European pearl mussel *Margaritifera margaritifera* depending on latitude.

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The investigation continues the discussion of how much species of the genus *Margaritifera* pearl mussels are in the northern Europe - one (Сергеева et al, 2008) or three, according the comparatory method used by Bogatov (Богатов, 2009). Comparatory method, used by him is based on frontal section of valves, and suggests that there are 3 species of pearl mussel, *M. elongata*, and *M. borealis*. The biometric measurements of 1711 individuals from 14 rivers from White Sea and Baltic Sea basins of Russia and Latvia was done and results analyzed. The variability in populations is high, shells of northern samples group are more flattened (f. *margaritifera*), but southern more convex, inflated (f. *elongata*), and boundary between them is on the 63° N.

In the analysis of intra-population variability revealed that individuals of all 3 shell morphology forms are present in the populations, the corresponding f. *margaritifera*, f. *elongata* and f. *borealis*. However, the hiatus between these forms in all the samples is missing and there are high frequencies of individuals belonging to two intermediate "forms." The proportion of individuals with very convex shell (f. *borealis*) in the samples increases towards the south. The hypothesis of the species specificity of the front shell sections based on the study of large samples of shells has not been confirmed, so the use of comparator method for freshwater pearl mussels is not correct. Taxa isolated by this method can not be considered as a species, and pearl mussel, *Margaritifera margaritifera*, populate the rivers of northern and central Europe, belongs to a single species *Margaritifera margaritifera*, which should be considered when dealing with the identification key (Bogatov et al., 2003; Prozorova, 2004; Определитель..., 2004.)

Богатов В.В. Принадлежат ли европейские жемчужницы рода *Margaritifera* (Mollusca, Bivalvia) к одному виду? // Известия РАН. Сер. биол. 2009. № 4. с. 497-499.

Bogatov V.V., Prozorova L.A., Starobogatov Y.I. The family Margaritiferidae (Mollusca; Bivalvia) in Russia // Ruthenica. 2003, v. 13, № 1, p. 41-52.

Определитель пресноводных беспозвоночных России и сопредельных территорий. т. 6. Моллюски, полихеты, немертины. Под ред. В.В. Богатова и С.Я. Цалолихина. СПб.: Наука, 2004. 526 с.

Prozorova L.A. Pearl mussels of the genus *Margaritifera* (Mollusca, Bivalvia, Margaritiferidae): specific content, distribution and shell morphology // Mollusks of the Northeastern Asia and Northern Pacific: Biodiversity, Ecology, Biogeography and Faunal History. Abstracts of the conference. Vladivostok, 2004, p. 110-113.

Сергеева И.С., Болотов И.Н., Беспалая Ю.В., Махров А.А., Буханова А.Л., Артамонова В.С. Пресноводные жемчужницы рода *Margaritifera* (Mollusca: Bivalvia), выделенные в виды *M. elongata* (Lamarck, 1819) и *M. borealis* (Westerlund, 1871), принадлежат к виду *M. margaritifera* (Linnaeus, 1758) // Известия РАН. Сер. биол. 2008. № 1. с. 119-122.

The populations of the freshwater pearl mussel *Margaritifera margaritifera* (Linnaeus, 1758) and the thick shelled river mussel *Unio crassus* Philipsson, 1788 in river basin Palsa

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The river Palsa is the tributary of Gauja, the catchment area is about 236,3 km². There are 3 nature reserves established in 2004 with status of Protected Areas of NATURA 2000 in the Palsa basin. The aim of these nature reserves is to protect populations of 2 mussel species - the freshwater pearl mussel *Margaritifera margaritifera* (Linnaeus, 1758) and the thick shelled river mussel *Unio crassus* Philipsson, 1788, and habitats.

The most of Latvian *Margaritifera margaritifera* population lives in the basin of Palsa river (Rudzite 2004). *Unio crassus* is present on all the territory of Latvia, but many of populations are aged and disappearing, on the basin of Palsa river this species have numerous, but fragmented population. Both species have species conservation plans.

The aim of study is to estimate the survival possibilities of both species on the basin of the Palsa river. The work tasks are 1) counting of specimens of both species, using the method of monitoring of NATURA 2000 sites, 2) estimating and calculating the density of populations of both species, 3) analysing the chemical quality of the water, 4) evaluating the benthic species and their biomass, 5) establish the main sources of pollution.

The population density of pearl mussels *Margaritifera margaritifera* in river basin Palsa is very low compared with the typical population density of 1000 to 2000 mussels m^{-2} , but it is highest in Latvia, and density found in 2011. is similar to 2004. The pearl mussel *Margaritifera margaritifera* population aging has been established in 2000.

The population density of thick river mussel *Unio crassus* density found in 2011. is similar to 2004., and it is the highest found in Latvia.

The age structures of populācijas vecumstruktūras shows, that population of pearl mussels *Margaritifera margaritifera* populācija still is aging, but population of thick river mussel *Unio crassus* is optimal. However some young individuals (< 5 cm) pearl mussels are found.

Pearl mussel population would perish in a few decades. Thick river mussel population part upstream is not at risk, but the downstream part is endangered by pollution of the pig farm Eķītes.