

Status of Species, Population Structure and Survival Capabilities of Freshwater Pearl Mussel *Margaritifera margaritifera* (Linnaeus 1758) in Latvia during 1999- 2009.

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Latvian Fund for Nature proceeded with freshwater pearl mussel investigations initiated by the students of Latvian State University in 1974. In 1994 the freshwater pearl mussel *Margaritifera margaritifera* L. protection program was established, first it associated 10 projects, carried out in 1999-2005; performed by Latvian Fund for Nature. After 2005 this function has been undertaken by Malacological Society of Latvia.

During the time span between 1999 and 2007 altogether 163 rivers have been surveyed (totally 610 km) (Rudzīte 2001, Rudzīte 2004, Rudzīte 2005), but in 2008 and 2009 more than 95 watercourses (more than 100 km) were specially examined. As a result 8 freshwater pearl mussel locations have been recognized, while empty shells are found in seven rivers. Total number of freshwater pearl mussels is about 25 000 and the extension of the population area is 40 km (Rudzīte 2005).

In the year 1999 and 2000 the age structure of pearl mussel populations has been studied and compared with the data of 1977; all the populations are found to be in the ageing stage (Rudzīte 2001).

The cycle of development of the freshwater pearl mussel has been studied: the eggs, glochidia, parasitic cyst stages, host fish populations. In the year 2000 and 2001 the salmonid fish smolt gills from 8 pearl rivers were examined, and they were invaded with glochidia cysts. In the year 2005 egg development and glochidia on the female mussel gills were studied, with harmless methods. The normal development of eggs and hatching is observed. On control fishing, all the swift river fishes were recognized, but natural resurgence of salmonid fish was found insufficient. From the year 2004 to 2007 in the freshwater pearl mussel rivers several thousands brown trout *Salmo trutta m. fario* (L.) smolts were released.

The beavers are recognized in all the freshwater pearl mussel rivers, they destroy large territories - the habitat of pearl mussels and salmon fish - by building dams. In the 2005 nine hunting cooperatives were involved to control the number of beavers in the freshwater pearl mussel locations and to establish the habitats (Rudzīte 2005, Rudzīte; Znotiņa 2006). From 2005 to 2008 the 215 beavers have been hunted and 181 dams destroyed in the protected areas.

In the 2006, the complex investigations of the ecological system in the Rauza river basin were carried out and hydrobiological and hydrochemical analyzes in 20 points showed impact of pollution sources and nitrogen content unfavorable to mussels.

To determine the importance of the river basin for the surviving of mussels, the territories with different land usage were studied and verified with correlation and regression analysis. The basins with alive pearl mussels are associated with forests and wetlands, but less with agricultural lands. The regression analysis gives us possibility to estimate eventual freshwater pearl mussel *Margaritifera margaritifera* rivers in the North Vidzeme Biosphere reserve. Although no pearl mussels have been found there, another rare mussel species living in the swift rivers and vulnerable to pollution - thick shelled river mussel *Unio crassus* - was recognised.

In the 2007, in the Rauza river 14 freshwater pearl mussels were found, at the age of 7 to 9 years, having shell size 40 - 50 mm, which are the youngest individuals of this species known for Latvia since such investigations are carried out. Latvian pearl rivers, according to the Swedish valuing system (Erikson et al.

1998), correspond to the Class I (“Site of nature conservation value”) and Class II (“High nature conservation value”), but none of them corresponds to the Class III (“Very high nature conservation value”). The condition of two populations corresponding to the Class II, may be valued as good, they have the chance to survive.

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