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THE ENDANGERED SWAN MUSSEL *ANODONTA CYGNEA* (LINNAEUS, 1758) IS THREATENED BY THE COMMON OTTER *LUTRA LUTRA*

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ABSTRACT: A heavy otter predation on the swan mussel was recorded in early spring in a fish-pond in SW. Poland. Although natural predation was not regarded as a threat to the swan mussel in Poland, it is likely that in areas where the otter (and possibly also mink, raccoon and muskrat) is common the mussel's populations may suffer heavy losses.

KEY WORDS: mollusc conservation, predation, diet, threats

The genus *Anodonta* in Central Europe is represented by two species: *Anodonta anatina* (Linnaeus, 1758) and *A. cygnea* (Linnaeus, 1758). The former is much more widespread and common than the latter (GLÖER et al. 1992, FALKNER et al. 2001). *A. cygnea* is strictly protected by law and included in the Red Data Books of Poland (ZAJĄC 2004), Czech Republic and Germany (GLÖER et al. 1992). It is also listed in Annex II and IV of the EU Habitats Directive (Directive 92/43/EC).

The shell of the swan mussel is elongated-oval and fairly convex, 12–16 cm in length. According to FELIKSIAK (1930) it may reach even 26 cm. It is therefore the largest freshwater mollusc in Central Europe and, in fact, the largest of all invertebrates. Other indigenous mussel species occurring in Poland reach only sporadically slightly more than 10 cm in length (KOŁODZIEJCZYK & KOPERSKI 2000). The upper and lower margins of the swan mussel's shell are often parallel. The valves are equally thin all along their height, umbonal rugae run parallel to the growth lines and sometimes coincide with these. The inhalent siphon is narrow with long papillae. The colour of the soft tissues is often rosy-orange. There are no hinge-teeth. These characters make this species easy to distinguish from other unionid species.

Before the 1950s, the swan mussel was regarded as a common species in Poland, but soon a widespread decline of its population was observed. For example, in Silesia, SW. Poland, it was only recorded at eight localities in the Odra Valley (ZAJĄC 2004). It occurs mainly in shallow eutrophic oxbows, lakes, fish-ponds and other water bodies.

So far, habitat degradation, resulting from destruction of small shallow water bodies, water pollution, and competition with *Anodonta anatina* are regarded as the main threats to this species (GLÖER et al. 1992, ZAJĄC 2004).

On the 7th of April, 2005, shells of 76 specimens (!) of the swan mussel with signs of otter (*Lutra lutra*) predation: holes in the shells made by the predator's teeth; characteristic dark, liquid excrements left on the dike, were found scattered over the southern dike (c. 200 m in length) of the Wołowski fish-pond near Rzędziwojowice, Niemodlin county, Opole district, Opole province, SW. Poland. Although the otter was not observed while preying upon the swan mussel in the fish-pond, it is known to occur commonly in this area (own, unpublished observations).

Most shells found on the dike were ca. 15 cm long, and ca. 10 cm wide. The measurements of four randomly selected shells were: 15.5 × 11.1cm, 15.2 × 10.0 cm, 15.0 × 10.2 cm, 14.6 × 9.8 cm. Some remnants of the mussel bodies were also found in the water close to the dam banks. In April of the following year, no fresh remnants of swan mussels around the dam were found. This may indicate that the mussels were no longer available to the otters in this pond. Some shells

from the previous year were however still visible on the ground.

The otter is known as mainly piscivorous, but in some areas, especially in fish-ponds, its diet may include a much wider spectrum of prey, such as small mammals, water birds, frogs, bivalves etc. (STUBBE & KRAPP 1993, KRUUK 1995). However, to date its heavy predation on the endangered swan mussel has not been documented (STUBBE & KRAPP 1993, KRUUK 1995, ZAJĄC 2004).

To date natural predation was not regarded as a threat to the swan mussel (ZAJĄC 2004). It is, however, likely that in areas where the otter is common, for example in fish-ponds, the swan mussel populations may suffer heavy losses caused by this carnivore (PIECHOCKI 2009). The distribution of the swan mussel shows a rather clustered pattern, so although generally rare, it forms quite large aggregations in some water bodies. It is likely that in such sites also the muskrat *Ondatra zibbeticus* and two alien predators, i.e. the mink *Mustela vison,* and the newly established raccoon *Procyon lotor* may also exploit the swan mussel. The otter, American mink and raccoon populations in Poland, as well as in other parts of Central Europe, are increasing, posing probably a serious threat to the swan mussel.

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