

**Confirmation of the presence of the spiny-cheek crayfish
Orconectes limosus (Rafinesque, 1817)
(Crustacea: Decapoda: Cambaridae) in Slovakia**

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Abstract. The spiny-cheek crayfish, *Orconectes limosus* (Rafinesque 1817) has been recorded in the Slovak-Hungarian stretch of the River Ipel (Ipoly) at Salka (Ipolyszalka) at the right bank of the river on October 18, 2008. This record confirms the further spreading of this invasive North American crayfish species into Slovakia. This finding is in harmony with other reports describing the fast spreading of this species in the Hungarian Plains of the Pannonian Biogeographical Region. During the same field trip the species was also detected at several localities nearby along the River Danube and Ipoly in Hungary.

Key words: *Orconectes limosus*, Crustacea, crayfish, invasion, first record, Slovakia, Hungary

Non-indigenous species are increasingly coming into the focus of limnological studies due to the significant ecological and economic consequences they cause. In rivers this process usually involves several taxa as e.g. a recent study on the middle section of the River Danube demonstrates (Puky et al. 2008). Due to their large size, high fecundity, good migratory ability and aggressive behaviour, physical effect on their habitats, ability to outcompete local species and the utilisation of a wide variety of food source, alien crayfish are important invasive species in Europe (Lindqvist & Huner 1999). Their presence is especially important in the conservation and management of indigenous crayfish species as North American crayfish species can spread crayfish plague, the oomycete *Aphanomyces astaci* Schikora, 1903, a disease lethal to the European species, that

has decimated populations over most of the continent from the second half of the 19th century (Alderman 1996). Together with pollution, habitat modification and eutrophication they may threaten the survival of native crayfish species.

Orconectes limosus (Rafinesque 1817) has a broad distribution in North America, principally in the Atlantic watershed from Maine to Virginia but it has also been introduced to Europe in the 1890s, Africa in the 1930s and Canada in the 1970s (Souty-Grosset et al. 2006). In Europe it is now one of the commonest aquatic invasive species present in at least 20 countries. One reason to explain its colonisation success in Europe is that this species is able to withstand conditions relatively unfavourable for indigenous species and can be found in all kinds of lowland waters including soft-

bottomed, silty, turbid and muddy waters such as in large rivers, polluted canals and organically enriched ponds and lakes. Also, unlike native species, e.g. *Astacus astacus* (Linnaeus 1758), *O. limosus* is not sensitive to land use changes and human activities (Schulz et al., 2002). As a result it is replacing indigenous species, such as *A. astacus*, as well as taking over habitats left vacant by the demise of local crayfish species due to the crayfish plague they usually carry.

Before 2006, when Petrušek and Petrusková proved the presence of *Pacifastacus leniusculus* (Dana, 1852) no alien crayfish species had been detected in Slovakia. However, as *O. limosus* have been recorded in most neighbouring countries (Souty-Grosset et al. 2006) and it is known to spread both actively and through human-mediated introductions to new localities (Petrušek et al. 2006, Pöckl & Pekný 2002, Puky & Schád 2006), and has been found close to Slovak territory both in the River

Danube and Ipel (Kovács et al. 2005), its appearance had been expected in Slovakia as well.

Several sections of the River Danube and Ipel (Ipoly) were checked manually during the day for the presence of crayfish on October 18, 2008 and by using torchlight during the night on October, 22, 2008. Biometrical measurements of the captured crayfish were taken with a metal calliper. Besides catching several individuals at the Hungarian sites, on October, 18, 2008, we also caught one male spiny-cheek crayfish specimen at Salka/Ipolyzalka, in Slovakia (Figure 1.). Its biometrical measurements were as follows: total body length 3.99 cm; carapace length 1.91 cm; weight 2.2 g. Localities with *O. limosus* records included the left bank of the River Danube at Hidegrét at Szob, left bank of the River Ipel at Letkés at the bridge and right bank of the river at Salka at the bridge. The river bank in the area was partly regulated, the sub-



Figure 1. Main rivers in the central part of the Carpathian Basin with an indication of the *Orconectes limosus* locality in Slovakia (red dot = *Orconectes limosus* locality at Salka/Ipolyzalka; Slo. = Slovenia; dashed line = border)

strate at the localities consisted of clay in the River Danube and boulders embedded in the muddy bottom in the River Ipel. At the latter site many crevices and hollows suitable for hiding places were seen.

In Austria the invasiveness of *O. limosus* is relatively low and in large rivers, where the habitat diversity, discharge and current velocity is high and crayfish density is low, native species can coexist with *O. limosus* (Pöckl & Pekny 2002). In other countries in the region, however, it is spreading fast as in Hungary (Puky & Schád 2006), already widely distributed as in the Czech Republic, Poland and Eastern Germany (Petrušek et al., 2006, Schulz & Śmietana (2002) or just entering the country as in Romania (Pârvulescu et al. 2009) and Slovakia (Jansky & Kautman 2007).

O. limosus is predicted to become a permanent fauna element of the River Ipel, especially in the lowest stretch. The structure of the riverbed offers suitable shelters (rocks in the regulated banks, submerged tree roots, etc.) and abundant food source in the form of macrophytes and green algae along both Slovak and Hungarian banks. This species may strongly influence other aquatic organisms (see e.g. Callaghan & Karlson 2002). However, the expansion of its distribution area upstream might be limited by dams on the River Ipel. As such, it is unclear if its presence will affect the three indigenous species living in upstream river sections or in mountain streams flowing into the river (Puky 2000).

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