Eriocheir sinensis: financial impacts in Germany

The Chinese Mitten Crab was introduced to Germany by shipping (see above). The first sighting of an adult crab was reported from the Aller river in 1912 (Peters 1933, Panning 1938, Panning & Peters 1932).

Tab. 6 Tentative calculation of cost since the first findings of the Chinese mitten crab in German waters. (Modified after Gollasch, unpublished).

Cost item (data adjusted from Fladung pers. comm.) costs from 1930s and 1940s calculated to today's value	**Estimated sub-total** [in €] conservative calculation	**Estimated sub-total** [in €] maximum calculation
• Costs of catchment gear installation During **1935-1945** in total 35 catchment installations, i.e. barriers, ramps, collection buckets were in use. The average cost per installation was 750 € During **1996-1998** four catchment systems were in use, capital costs total to	26,250 10,000	26,250 10,000
• Labour to clean and maintain catchment gear During the **1935-1945** the catchment season lasted for 8 to 10 weeks with 1 or 2 employees (estimated salary per week 300 €) During **1996-1998** labour costs totalled to	24,000 40,000	60,000 40,000
• The impact on bank erosion and feeding on native species are very difficult to quantify. The assumption results in several 10,000s €	20,000	50,000
• Loss in commercial fisheries (estuaries and rivers) Assuming that 250 fishermen were affected during **1930-1950** costs are estimated as 70,000,000 € (for 20 years annually ca. 14,000 € per fisherman) including repair of nets as crabs tend to cut net ropes. 60 fishermen were affected during the period **1994-2004** costs are estimated as 8,400,000 € (annually ca. 14,000 € per fisherman).	65,000,000 8,000,000	75,000,000 9,000,000
• Loss in commercial fisheries (pond fisheries), estimated for **1994-2004**. Impacts include predation of fish food and cultured pond fish	75,000	100,000
• Loss in commercial fisheries due to the predatory impact of the crabs on macrozoobenthos (fish food) resulting in e.g. poor growth of fish is calculated as 10,000 to 20,000 € annually during the 30 year duration of mass occurrences.	300,000	600,000
Estimated total	**73,495,250**	**84,886,250**

The impact of this invader became especially clear during the mass occurrences in German waters in the 1930s, 1940s, 1950s, 1980s and 1990s (Tab. 6). In total mass developments were reported for approximately 30 years (Fladung pers. comm.). During the four severe mass developments of the crab in the last century up to 140 t of juvenile crabs were caught annually. A single fishing net collected 50-60 kg of crabs per day (Fladung pers. comm.).

Especially in the 1930s, 1940s and 1990s, attempts were undertaken to catch and destroy as many crabs as possible. This implied labour costs and some catchment gear production at the German Rivers Elbe and Havel.

It was calculated that the monetary impact caused by this invader in German waters totals to approximately 80 million Euro since its first in 1912 (Tab. 6).

Other cost implications

Additional negative impacts are known, but cannot be quantified:

- impacts on biodiversity,
- impacts on recruitment of commercial species,
- increased erosion rate due to crab burrowing activities in river banks.

It should also be noted that a positive effect was documented. During mass occurrences crabs were and continue to be sold for 1 to 3 € /kg to the industry e.g. for industrial use and for direct human consumption (Asian markets). During 1994-2004 crabs in the value of approximately 3,000,000 to 4,500,000 € were sold. This amount needs to be deducted from the impact cost figures above to take account of "beneficial" effects.

Gollasch (in preparation)

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