MERCURY CONTENT IN MUSCLE OF CARP FROM NON-CONTAMINATED PONDS

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INTRODUCTION

Mercury is a highly dangerous element which has accumulative and persistent character in the environment and biota. Inorganic mercury may be transformed into methylmercury by sulphate-reducing bacteria in the bottom sediment. Methylation of inorganic mercury in the sediments represents a significant contribution to total content of methylmercury in the aquatic environment. Methylmercury is bioaccumulated and biomagnified in the food chain. Usually, the greater the weight and age of the fish, the higher is the content of mercury in fish. Monitoring of mercury contamination of fish in ponds is very important, because our ponds are the main source of freshwater fish production.

The aim of our study was to assess a total mercury content (THg) in muscle of marketable common carp from non-contaminated ponds in relation to body weight of fish.

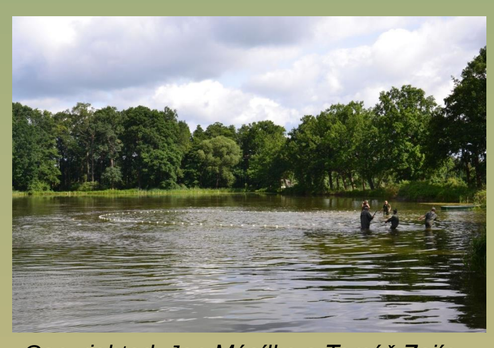
MATERIALS AND METHODS

A total of 215 common carps (*Cyprinus carpio*) was analysed. Collected fish were examined at 13 ponds of South and West Bohemia in 2001-2003.

Concurrently, samples of bottom sediment (in total 26 samples) were repeatedly collected to determine the total mercury content.

AMA 254

Common carp



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Determination of total mercury (THg)

A content of THg in muscle of common carp and in the bottom sediment was determined by cold vapour atomic absorption spectrometry using an AMA 254 (Altec Ltd., Czech Republic) analyser. The AMA 254 uses a mercury vapour generation with subsequent capture and with concentrate on a gold amalgamator.

The wavelength employed was 253.65 nm, the limit of detection was 0.01 ng of mercury, and the reproducibility was below 1.5%. For each sample, two independent measurements were performed. The AMA 254 computed the mean and the standard deviation. If the standard deviation was greater than 10%, the measurement was repeated.

The accuracy of THg values was validated using the standard reference material BCR-CRM 464 (Tuna Fish, IRMM, Belgium).

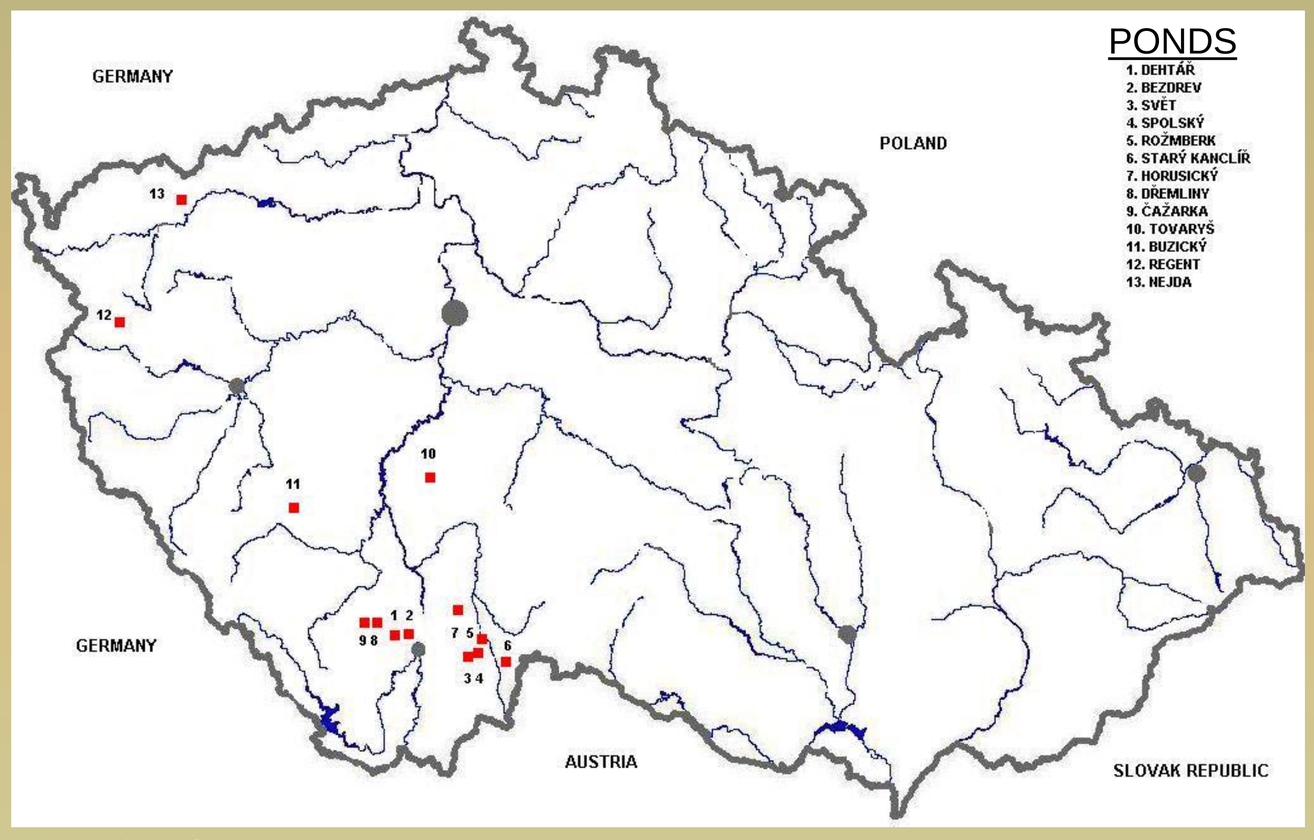

Fig. 1: Sampling ponds

RESULTS

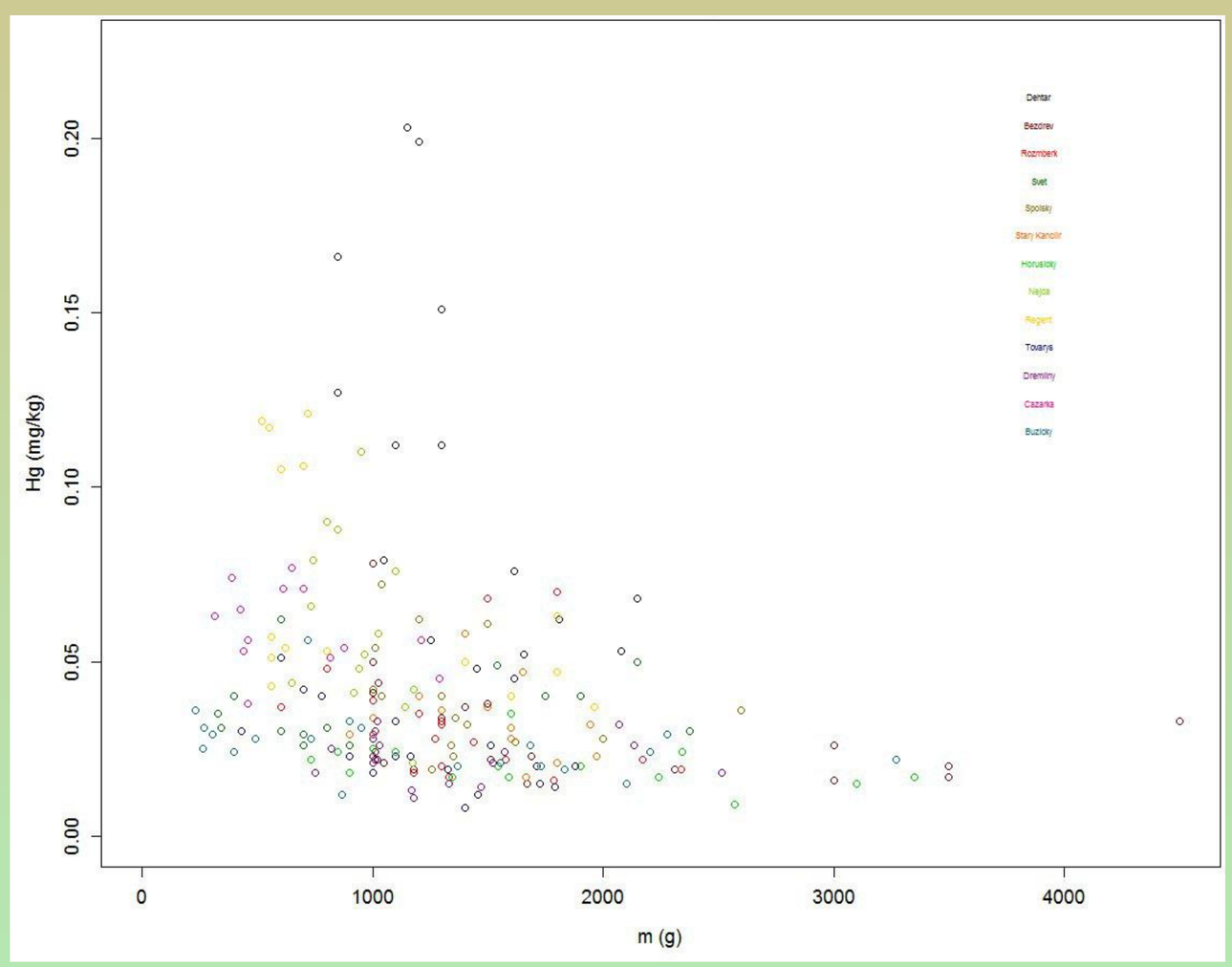

Fig. 2: Correlation plot of body weight and THg content in muscle

- The content of THg in muscle of marketable common carp from 13 ponds is given in Figure 2. THg content in bottom **sediments** of these ponds ranged between 0.5 – 2 $mg.kg^{-1}$ of organic matter, which means that ponds were not contaminated with mercury.
- A correlation between mercury content (THg) in **muscle** and **body weight** (m) is displayed in Figure 2. The correlation between these two parameters was negative and Pearson correlation was $r_p = –0.269$, $p < 0.001$ and Spearman correlation was $r_s = –0.382$, $p < 0.001$. THg content in muscle decreases significantly with growing body weight of carps from ponds relatively non-contaminated with mercury. The point is that a relative amount of total mercury in muscle decreases but absolute amount of total mercury remains the same.
- The decrease of the relative amount is probably caused by the intensive weight gain. All authors, in contrast to our results, state that THg content in muscle increases with growing age and body weight of fish.

CONCLUSIONS

The total mercury content in muscle of marketable carps from non-contaminated ponds decreases with growing body weight. It is probably caused by the intensive weight gain.

ACKNOWLEDGEMENT

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INVESTICE DO ROZVOJE VZDĚLÁVÁNÍ