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## INTRODUCTION

In marine environments, heavy metals cannot be degraded, they are accumulated, assimilated, or incorporated in seawater, sediment, and marine organisms (Phillips and Rainbow, 1994).

Three species of cetaceans occur in the Black Sea –Black Sea Common Dolphin (*Delphinus delphis* ssp. *ponticus*), Black Sea Bottlenose Dolphin (*Tursiops truncatus* ssp. *ponticus*) and Black Sea Harbor Porpoise (*Phocoena phocoena* ssp. *relicta*). The current study attempt to gather data for presence and accumulation of five elements (heavy metal) in tissues of the three species of cetaceans in Black sea - lead (Pb), cadmium (Cd), zinc (Zn), copper (Cu), nickel (Ni). Heavy metals are also investigate in a few fish species, included in the cetaceans diet - Mediterranean horse mackerel (*Trachurus mediterraneus*), Atlantic bonito (*Sarda sarda*), bluefish (*Pomatomus saltatrix*).

## RESULTS

### NORTHERN REGION

### SOUTHERN REGION

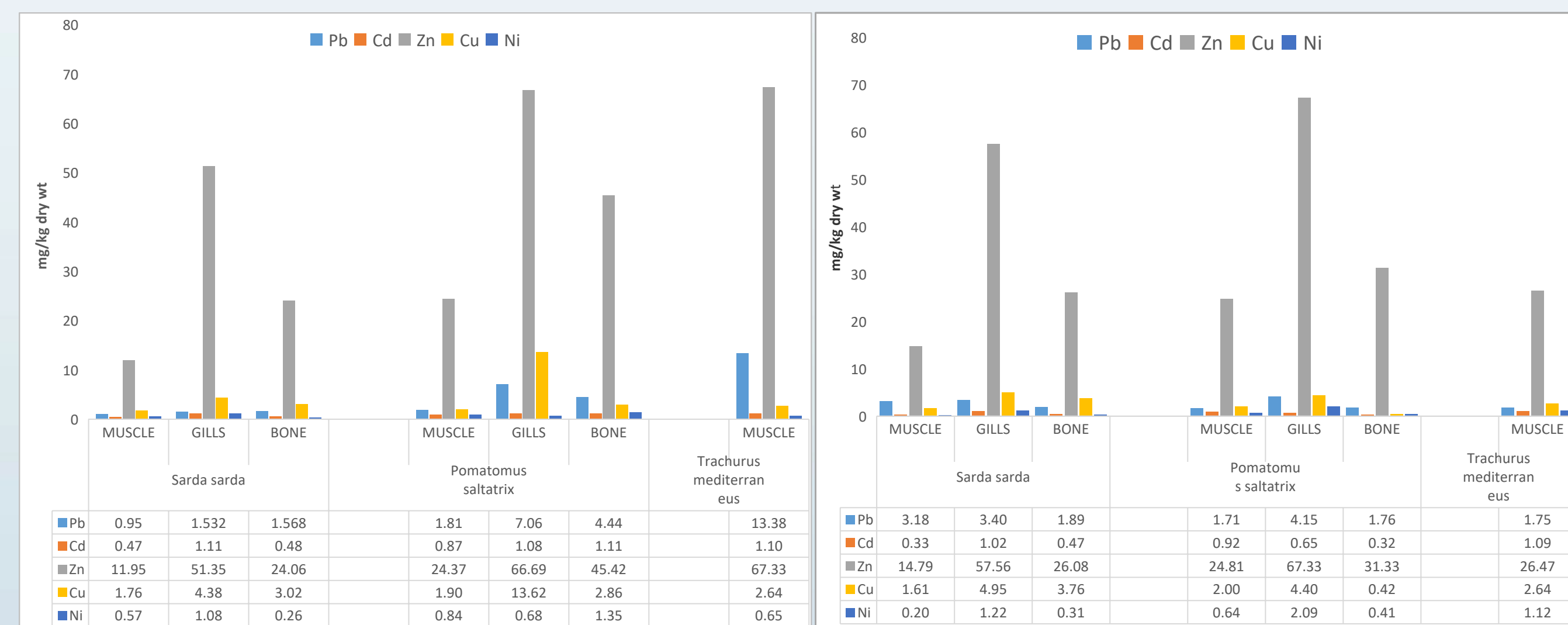


Fig. 1 Concentrations of heavy metals (mg/kg dry weight) in different tissues of fish along the southern and northern Bulgarian Black Sea.

### Sampling period autumn 2022



## METODOLOGY

A total of 16 samples were collected - 3 fish species from North and South regions - Mediterranean horse mackerel (*Trachurus mediterraneus*), Atlantic bonito (*Sarda sarda*), bluefish (*Pomatomus saltatrix*), and 2 cetacean bone samples - 1 *P. phocoena* and 1 *D. delphis*.

Fishes were dissected and prepared samples from muscles, bones and gills and for each species, the samples are collected from several specimens. From the cetaceans was prepared only bone samples. The samples were processed by air-drying, grinding and mixing with concentrated acids. The content of pre-selected heavy metals was determined by ISP "OPTIMA 7000" Perkin-Elmer in the Atomic Absorption Spectrophotometry Laboratory.



### Acknowledgments

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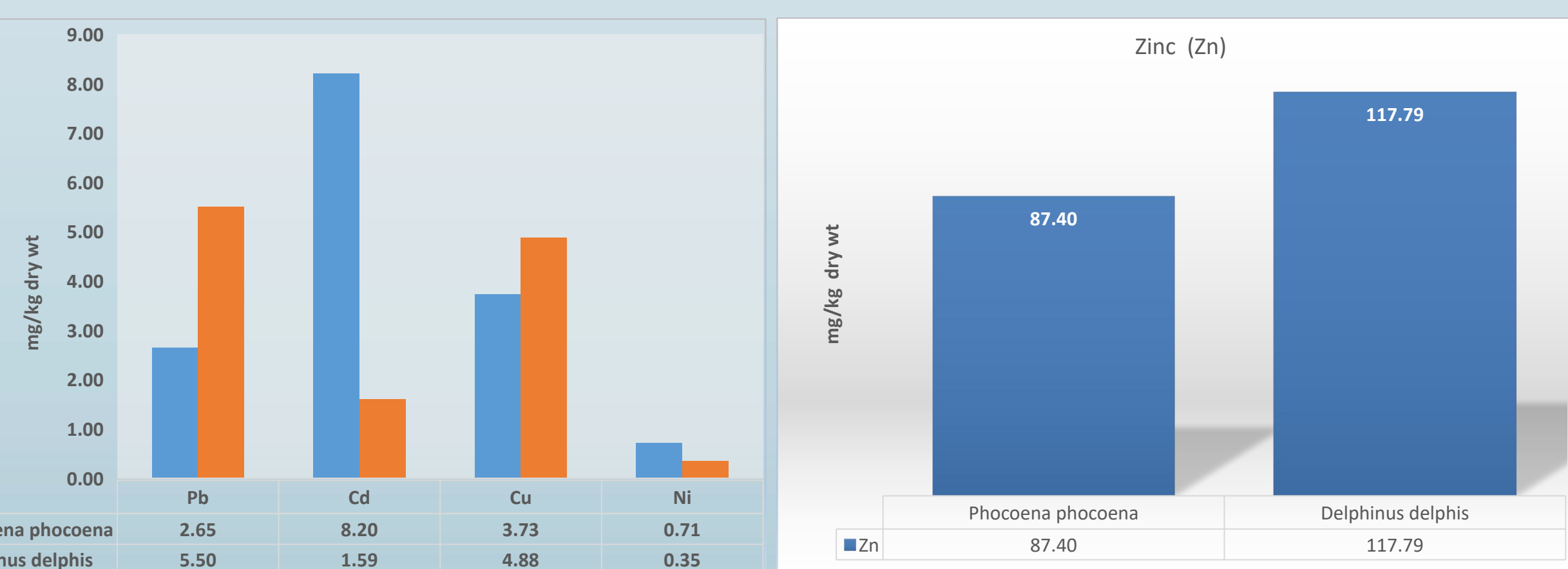


Fig. 2 Concentrations of heavy metals (mg/kg dry weight) in cetaceans.

### BIOMAGNIFICATION IN CETACEANS

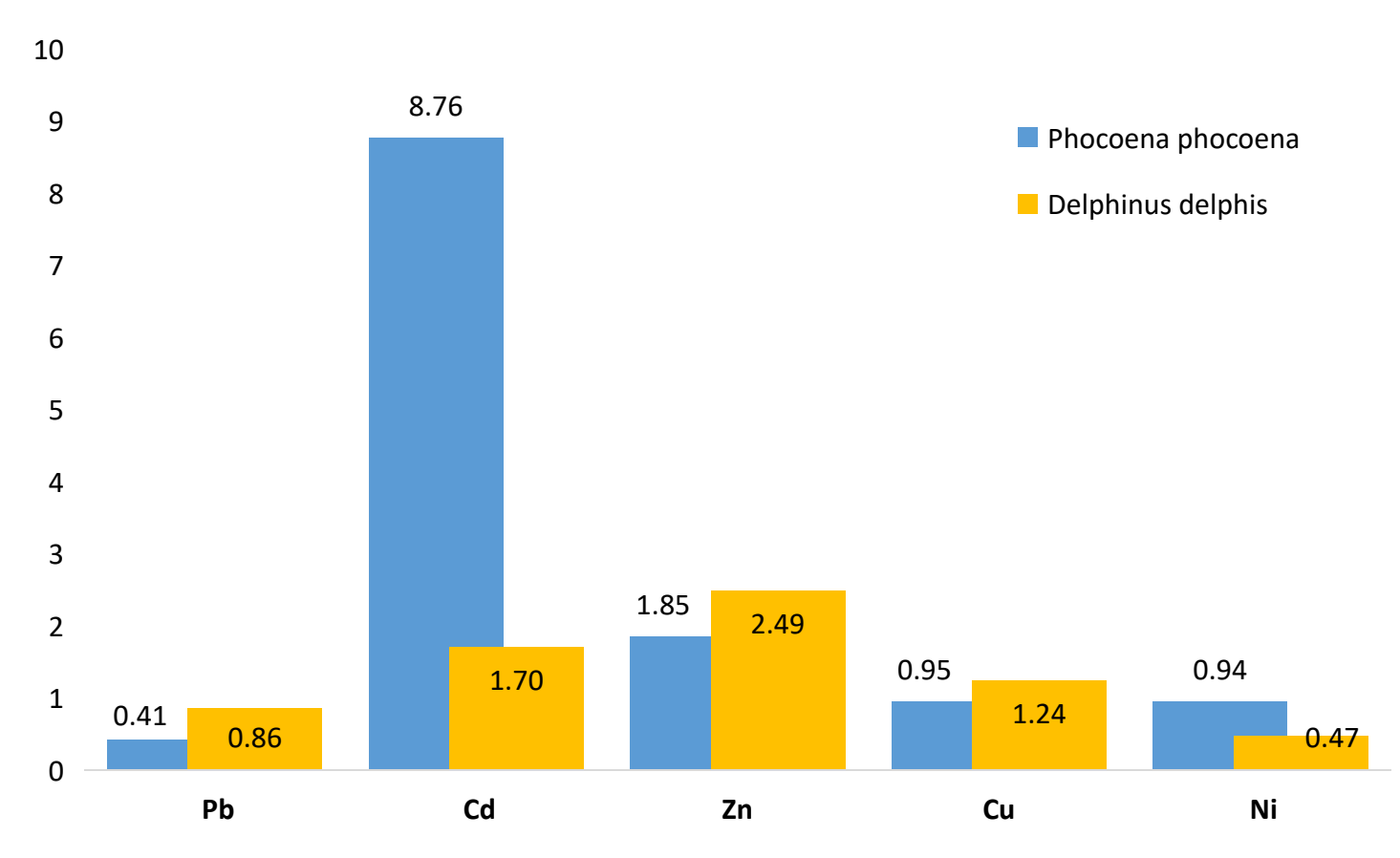


Fig. 3 Biomagnification of heavy metals in cetaceans.

Ratio of average concentration in cetaceans to average concentration in their food (fish). Values above 1 indicate biomagnification (Fig.3).

## CONCLUSION

The distribution of the heavy metal concentration follow this pattern:

- Zn > Cu > Pb > Cd > Ni (in fish),
- Zn > Cd > Cu > Pb > Ni (in cetaceans).

### Fish

- Zinc (Zn) and copper (Cu) mainly accumulate in fish, and their concentration is highest in the gills.

### Cetaceans

- In cetaceans, the concentrations of zinc (Zn) and cadmium (Cd) are the highest.
- Biomagnification data in food chains are available for cadmium (Cd), zinc (Zn), and copper (Cu) for *D.delphis*.
- More samples from cetaceans and fish will be gathered in the next seasons, to order clarify better the bioaccumulation process of heavy metals in the marine mammals in Black Sea.