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“The study of the metal contents of some dominant plants and phyllospheric micro-organisms on Upper-Tisza area”



Objectives

- Examine the chromium, cadmium, copper, nickel, and zinc contents of the soils in the floodplain sites



- The element uptake of the vegetation (*Solidago canadensis*, *Rubus fruticosus*, *Artemisia vulgaris* L.) growing in these sites with special attention paid to the chromium, cadmium, copper, nickel and zinc contents in the roots and leaves of the floodplain



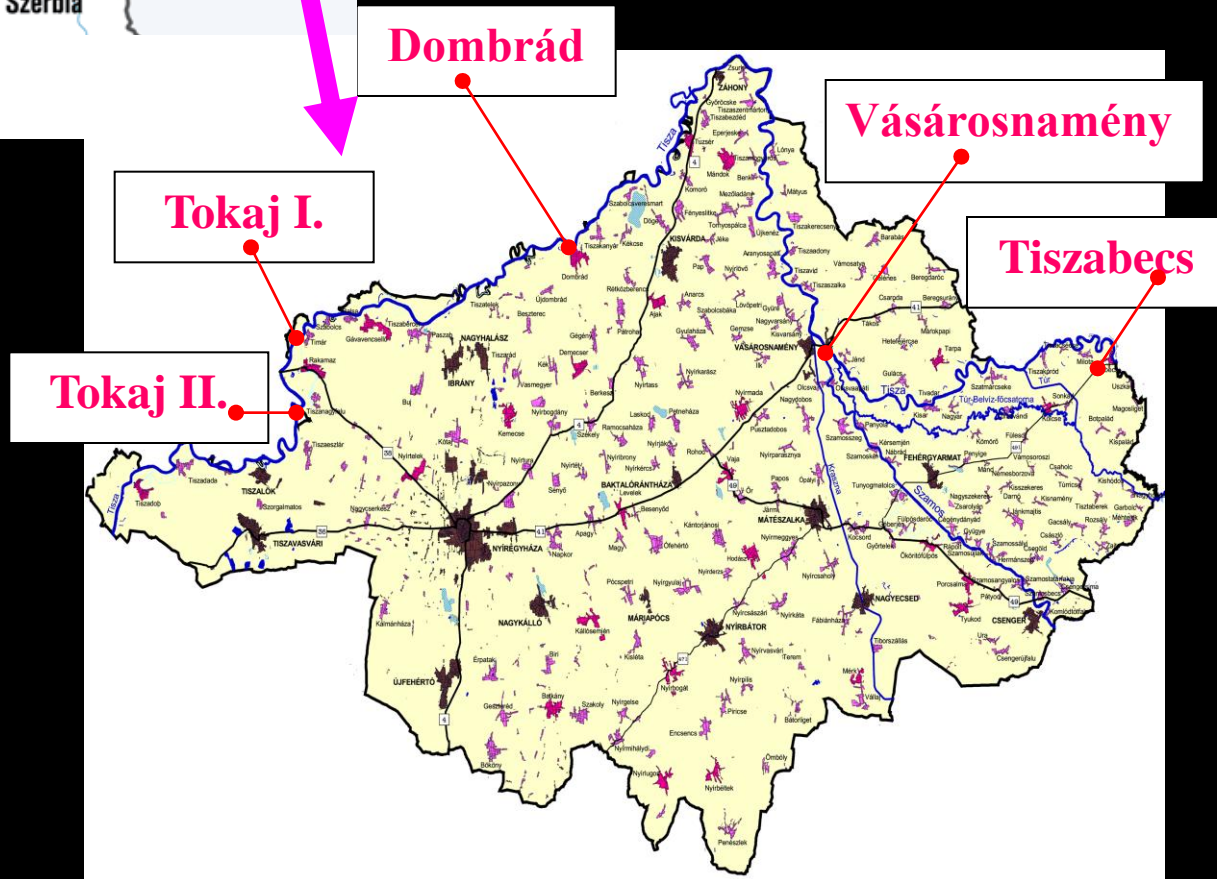
- The effects exercised by the heavy metals contents of leaves as detectable excess elements on the number and species diversity of bacteria colonizing leaf surfaces.





Materials and methods

Sampling sites



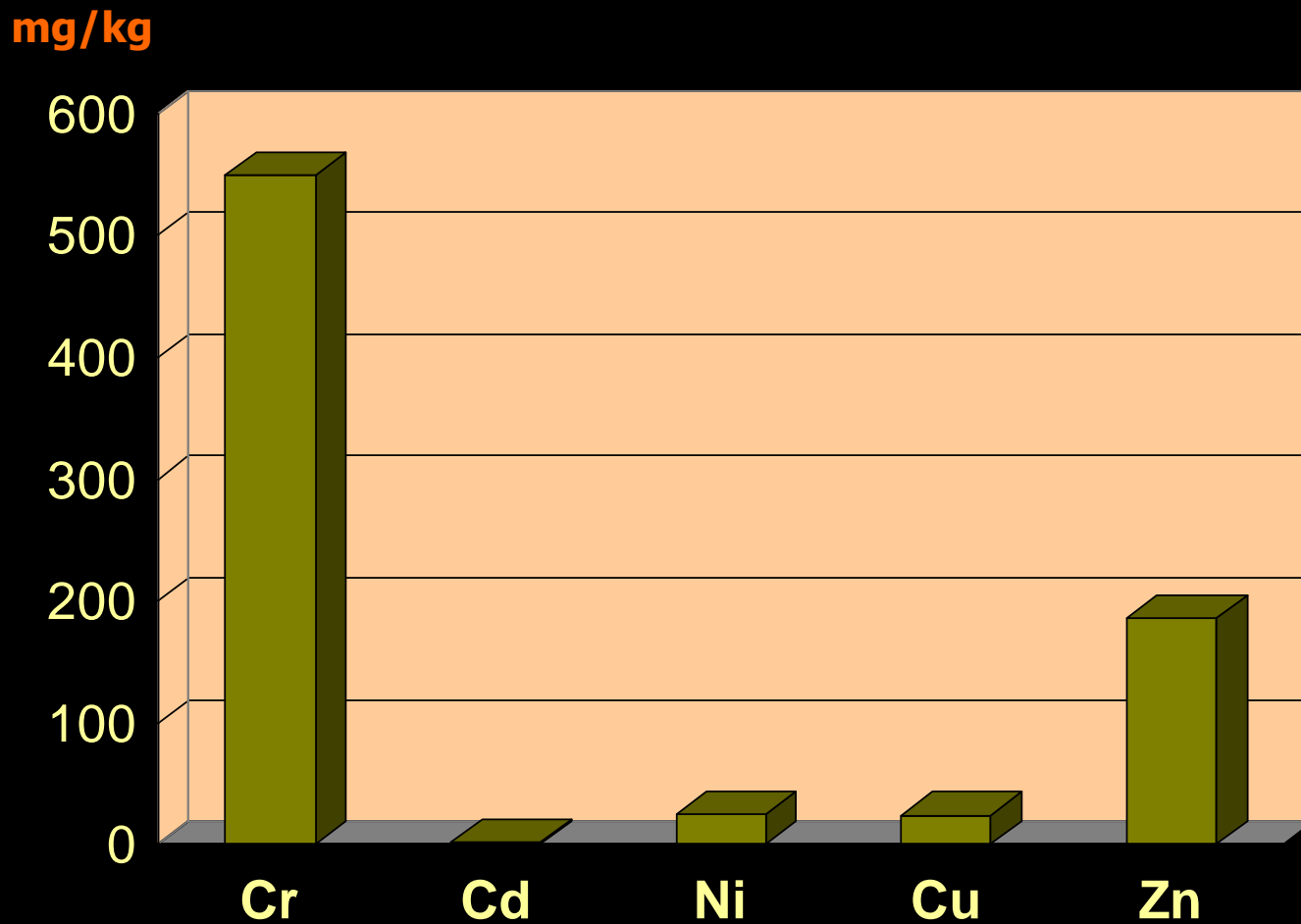
Sampling sites



Sampling and analysis

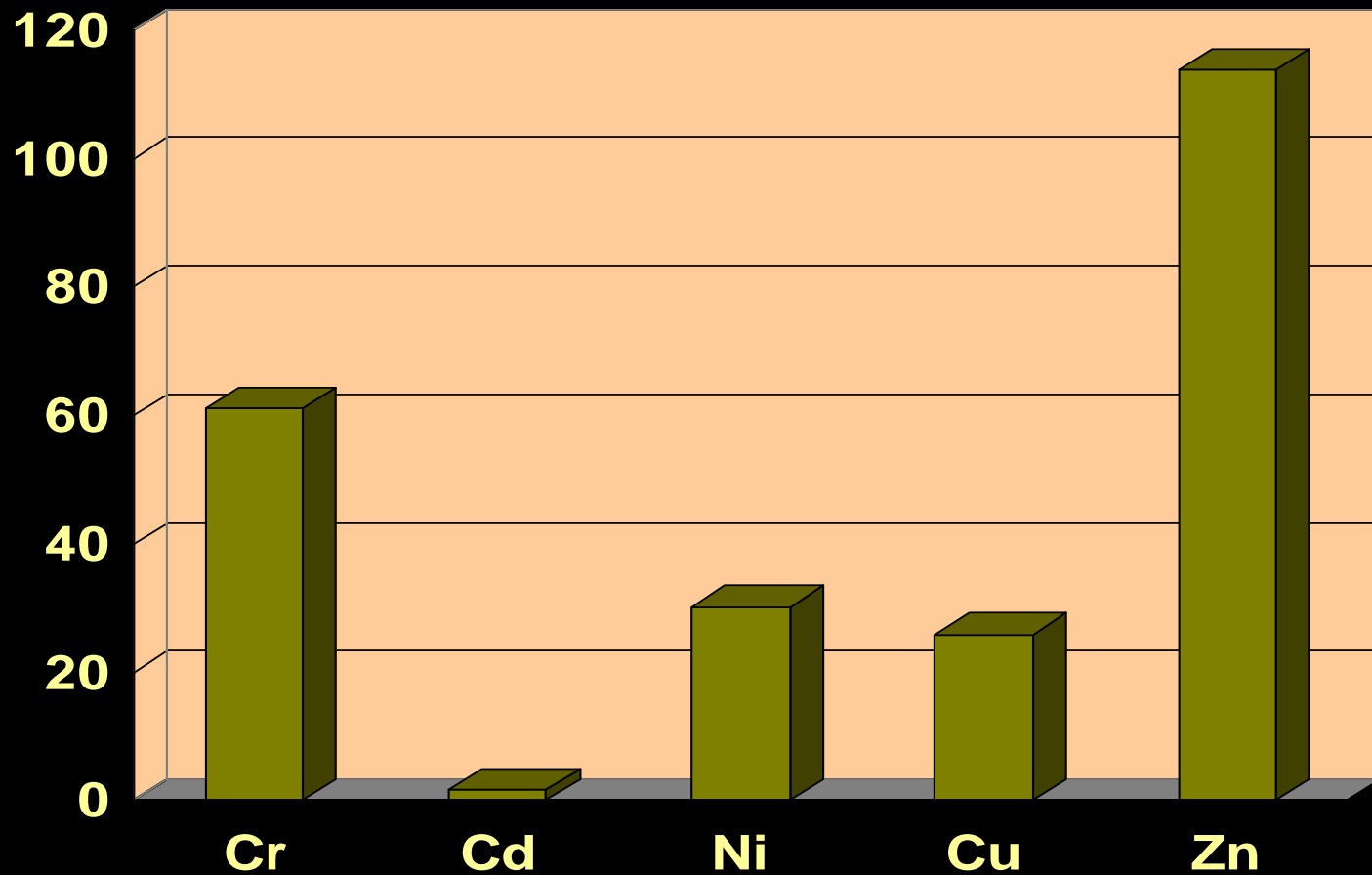
- In the investigation sites, soil samples were taken from the same depth of randomly delineated, 50 m² sample plots in triple repetitions. Such samples were dried to constant weight at 70°C.
- From the plots, 25 plants were selected. The roots and leaves of these plants were dried to constant weight at 70°C after washing.
- The metal content of the homogenized samples was analysed by X-Ray fluorescens spectrophotometry.
- Bacteria were studied in nutrient culture media.

Metal-content of soil on Tiszabecs area

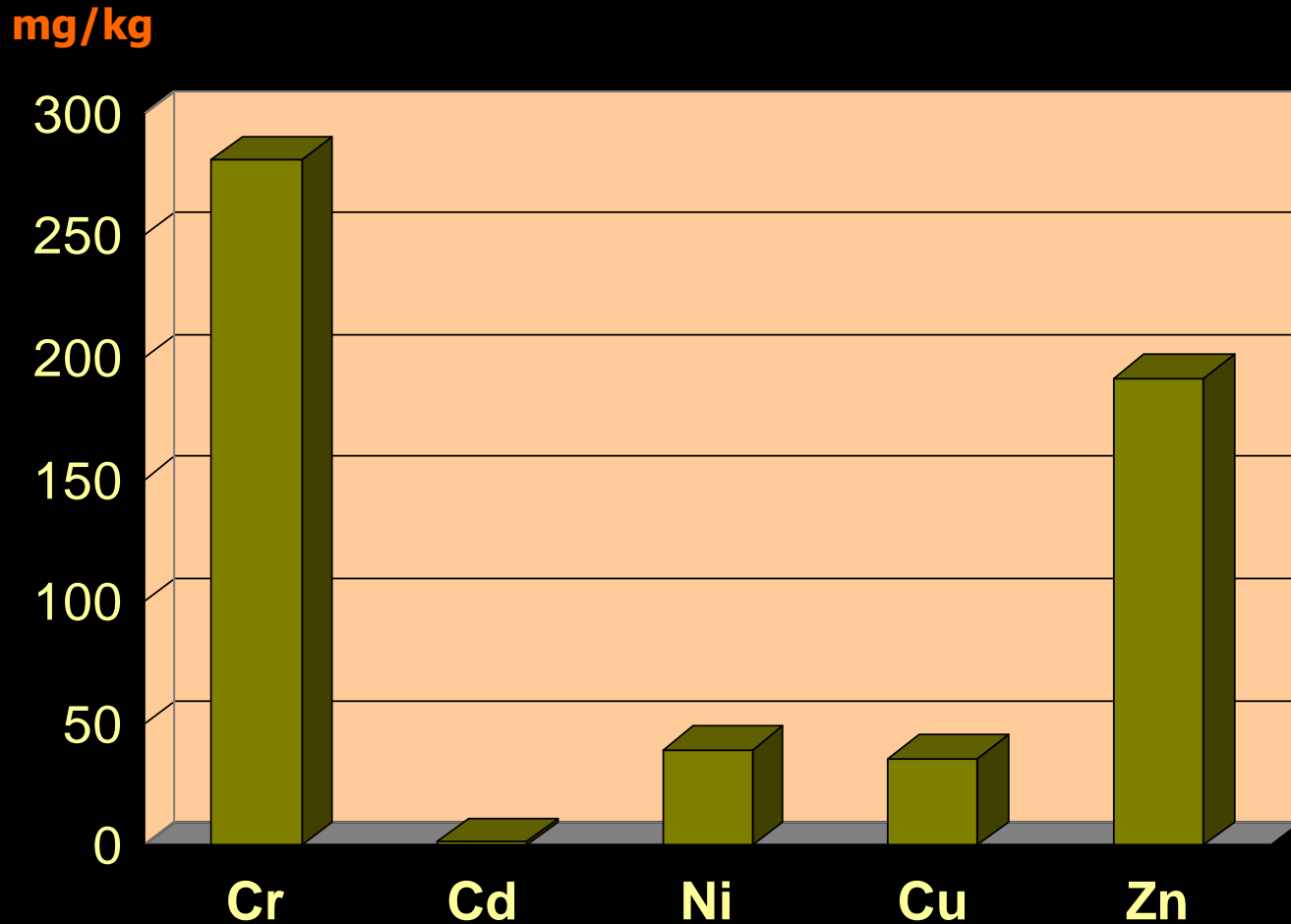


Metal-content of soil on Vásárosnamény area

mg/kg

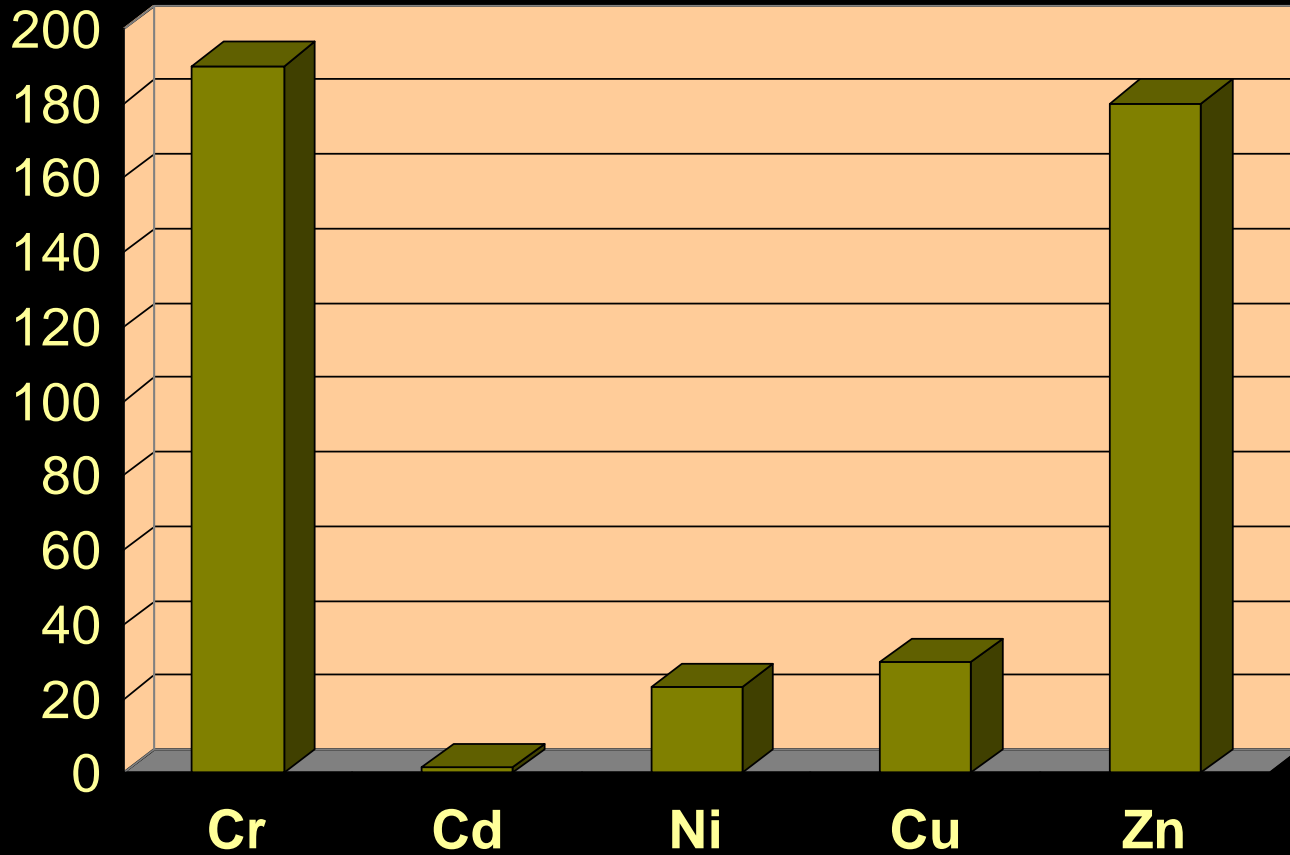


Metal-content of soil on Dombrád area



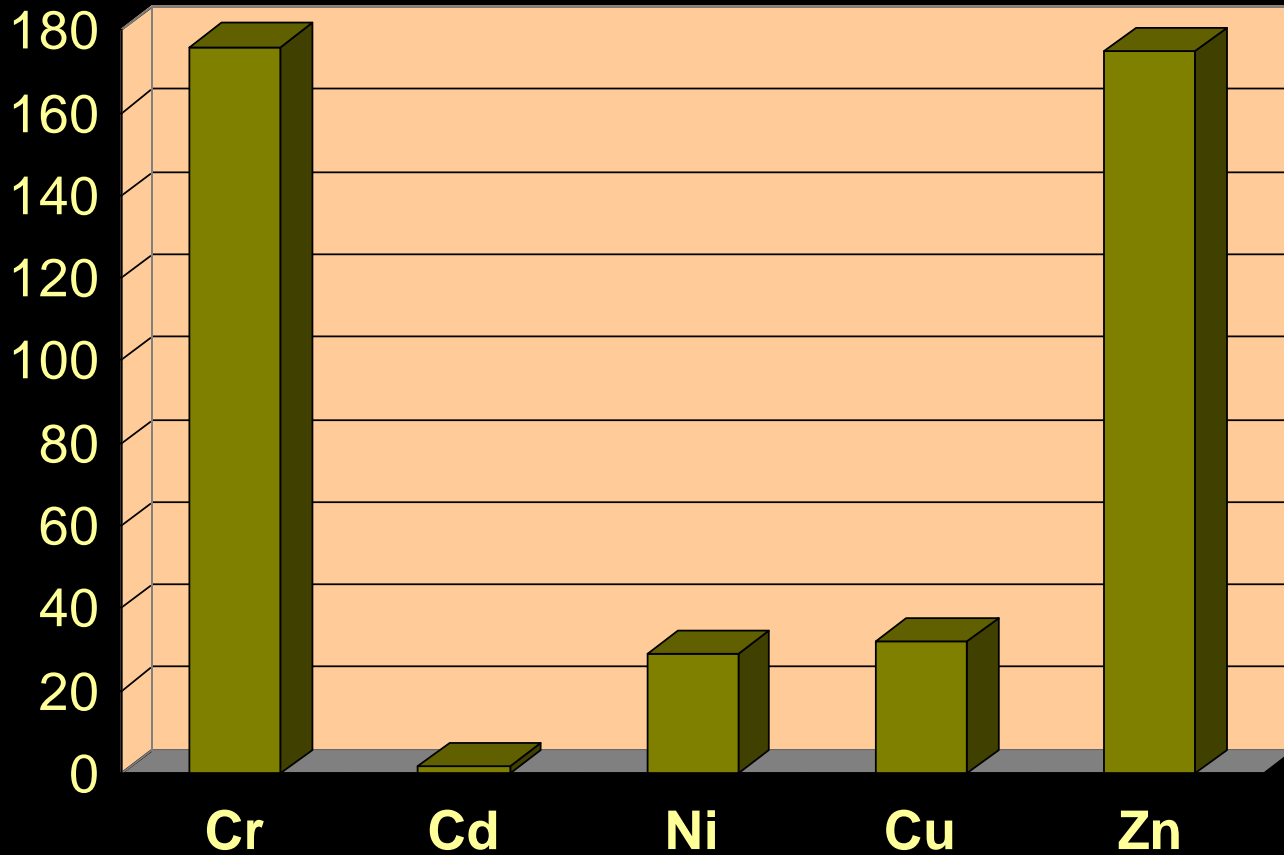
Metal-content of soil on Tokaj I. area

mg/kg

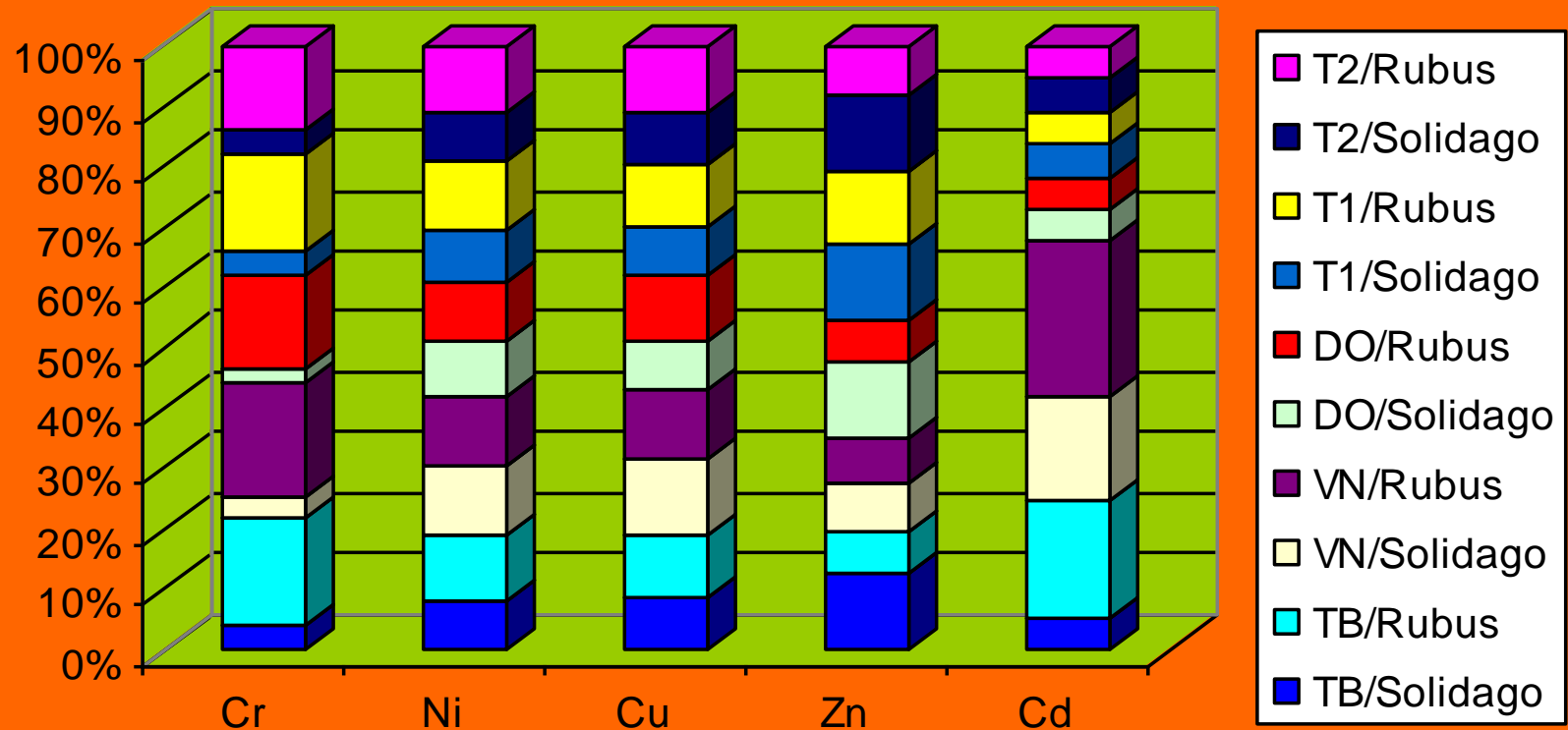


Metal-content of soil on Tokaj II. area

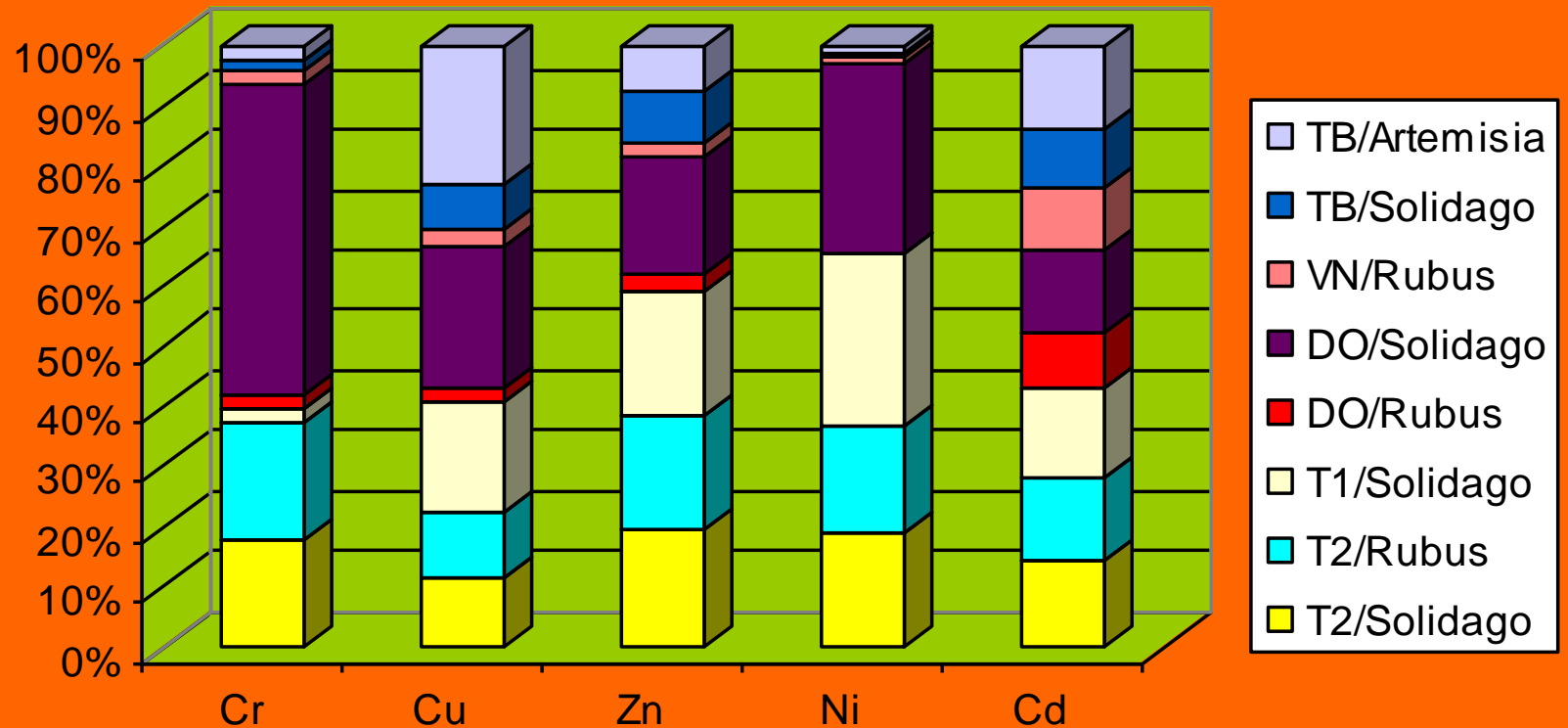
mg/kg



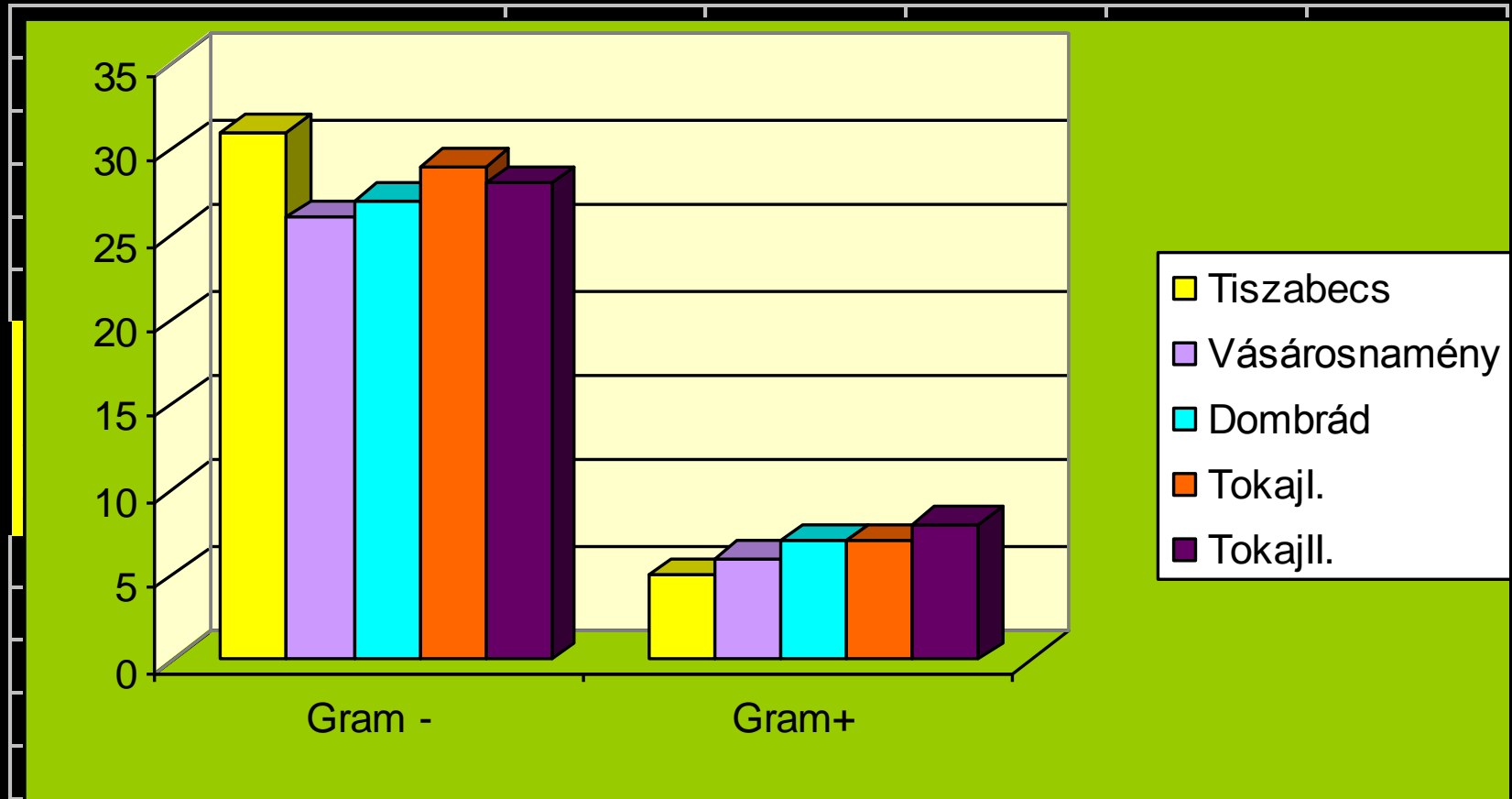
Heavy metals content of roots



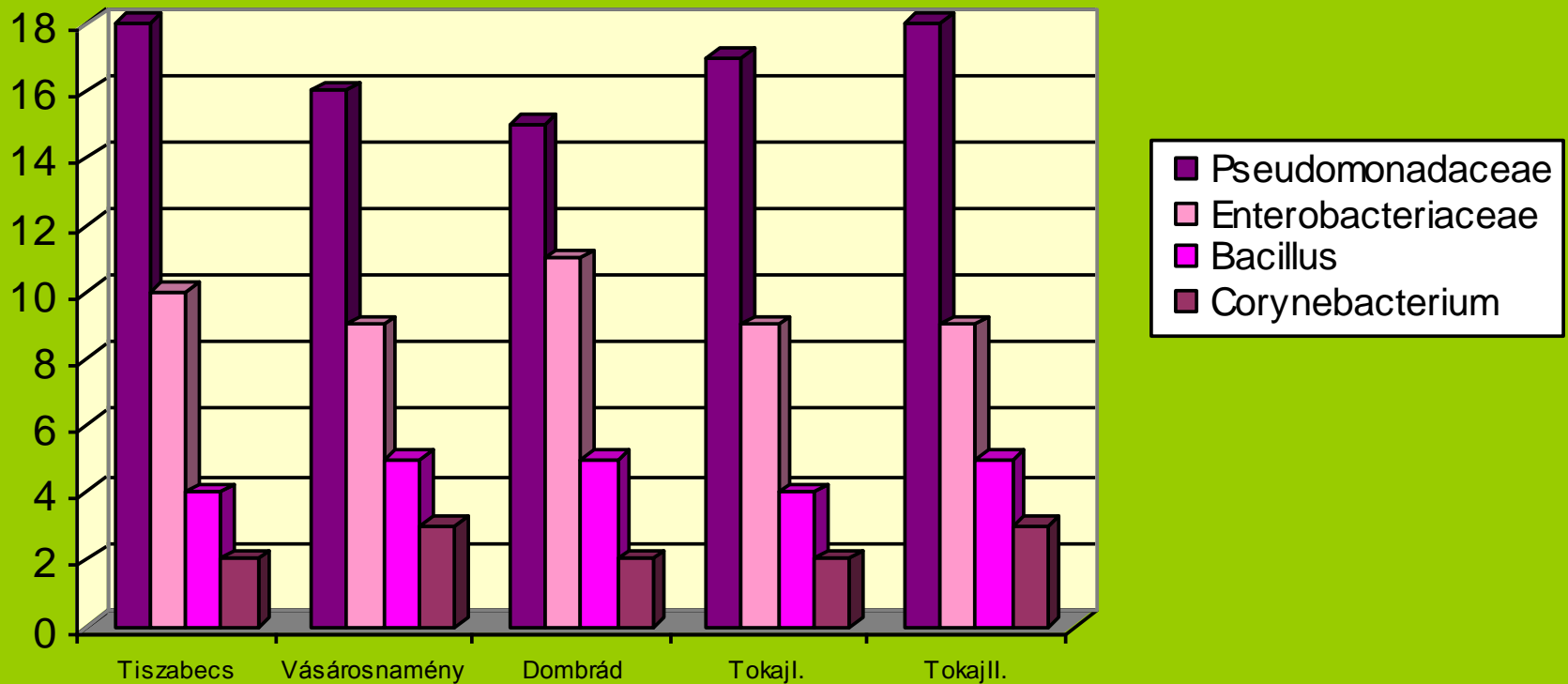
Heavy metals content of leaves



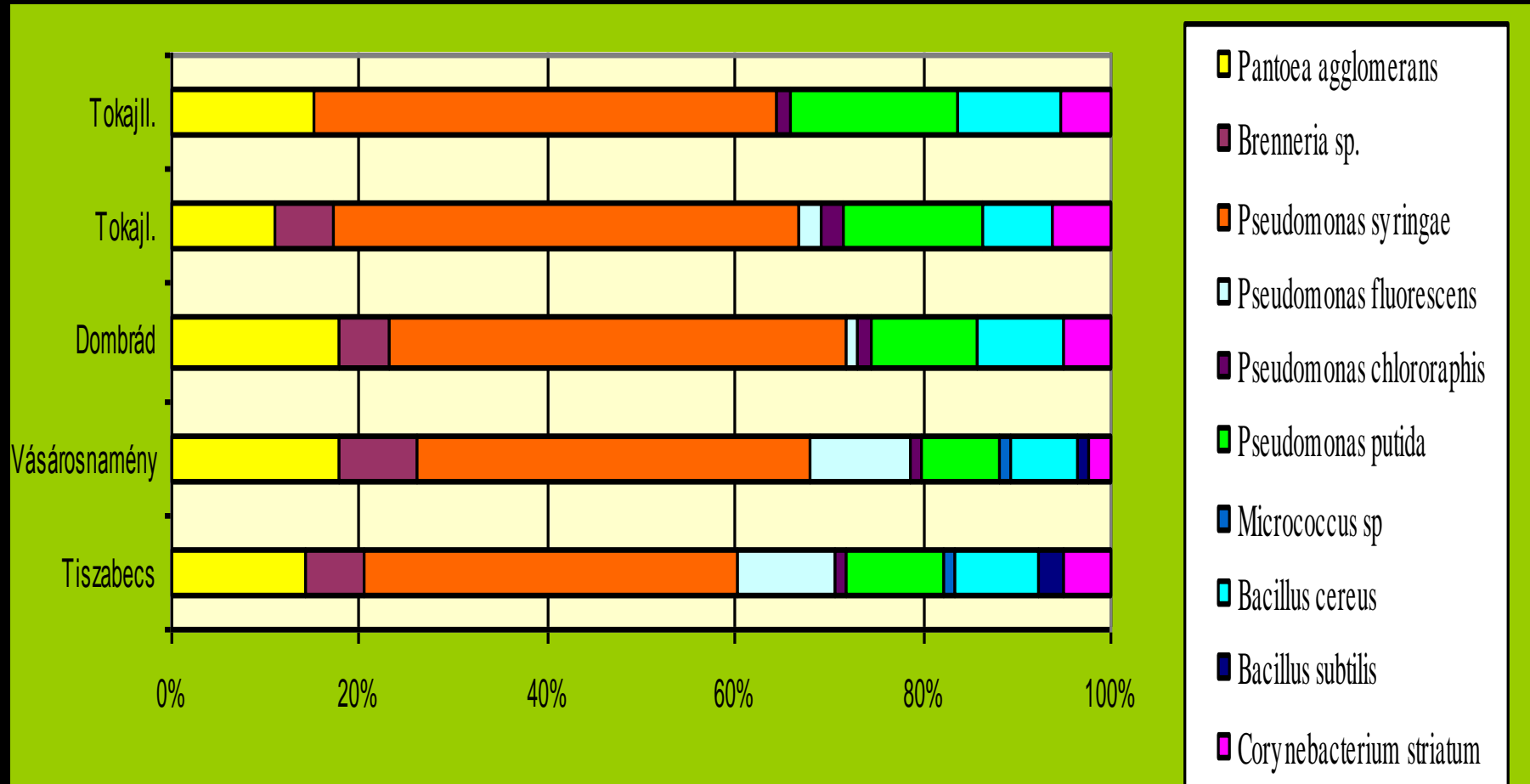
Bacteria of leaf surfaces



Bacteria of leaf surface



Bacteria-species of leaf on Upper - Tisza area



Conclusions

- The element contents of average chromium, and zinc contents are significantly higher than the copper, nickel and cadmium content of the all investigated soil samples.
- Strong positive correlation was found between increasing Cr, Ni and Cu contents in the soil and the Cr, Ni, Cu contents of the plants.
- The metal content was found larger of *Rubus fruticosus* than the other plants.
- Plants surfaces are dominantly colonized by the Gram - bacteria
- The dominantly species of the bacterium genera: *Pseudomonas* and *Enterobacter*.