

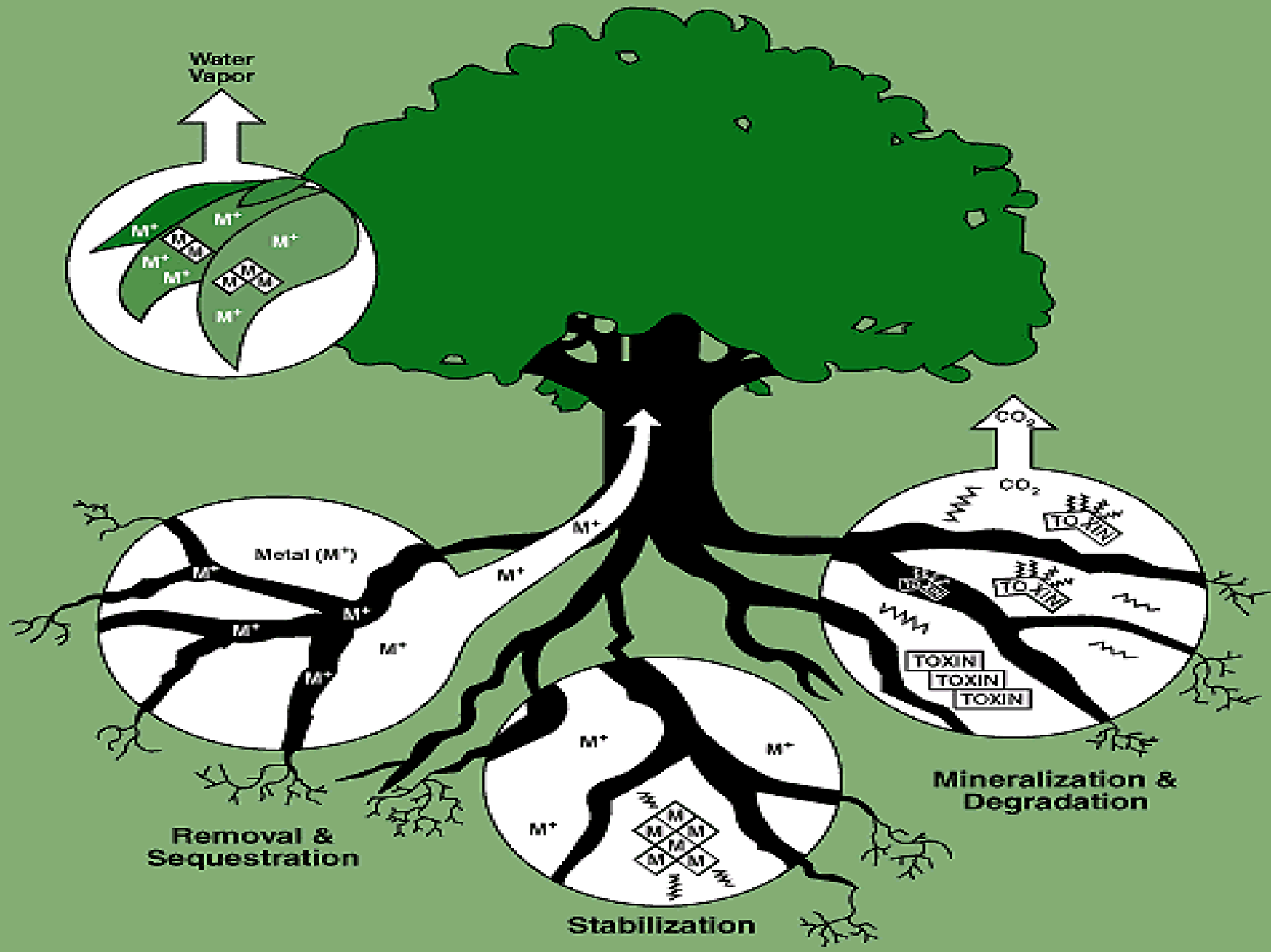
Potential of Different Poplar Clones in Phytoremediation of Some Heavy Metals

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Phytoremediation



Comtaminants

Cadmium

- Chlorosis
- Disorder of respiration and nitrogen metabolism
- Growth inhibition

Nickel

- Microelement
- Necrosis
- Fe deficiency

Lead

- Systemic toxin
 - binding with metalloenzymes
 - inhibiting synthesis of proteins
 - inhibiting synthesis of chloroplast and photosynthesis
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Previous research

Pilipović, A., Nikolić, N., Orlović, S., Petrović, N., Krstić, B. (2005) **Cadmium phytoextraction potential of polar clones (*Populus spp.*)**. Z. Naturforsch. 60c: 247-251.

Nikolić, N.; Pilipović, A.; Orlović, S.; Krstić, B.; Pajević, S.(2005) **The Potential of Poplars in Cleaning Waters Contaminated by Cadmium**. International Symposium on Danube Basin and Sustainable Development: Environment, Tourism, Legal Framework. Novi Sad, Serbia & Montenegro, 28-29 September 2005.

Nikolić, N.; Pajević, S.; Pilipović, A.; Krstić, B.; Borišev, M.; (2006) **The Potential of Poplars (*Populus sp.*) in remediation of lead contaminated environment**. II International Symposium of Ecologists of Montenegro, Kotor, Montenegro, 20-24.09.2006.

Material & methods

- ❑ **Hydroponically grown cuttings of:**
 - ❑ **Populus deltoides clone 37**
 - ❑ **Populus x euramericana clone 48**
 - ❑ **(P. nigra x maximowitzii) x P. nigra var. "Italica" clone 1044,**
- ❑ **0, 10 or 100 ppm Ni, Cd or Pb**
- ❑ **135 days (45+90)**

Material & methods

- ❑ Investigated parameters
 - ❑ Biomass production
 - ❑ Nitrate reductase activity (NRA)
 - ❑ Accumulation of heavy metals in roots, leaves and stem

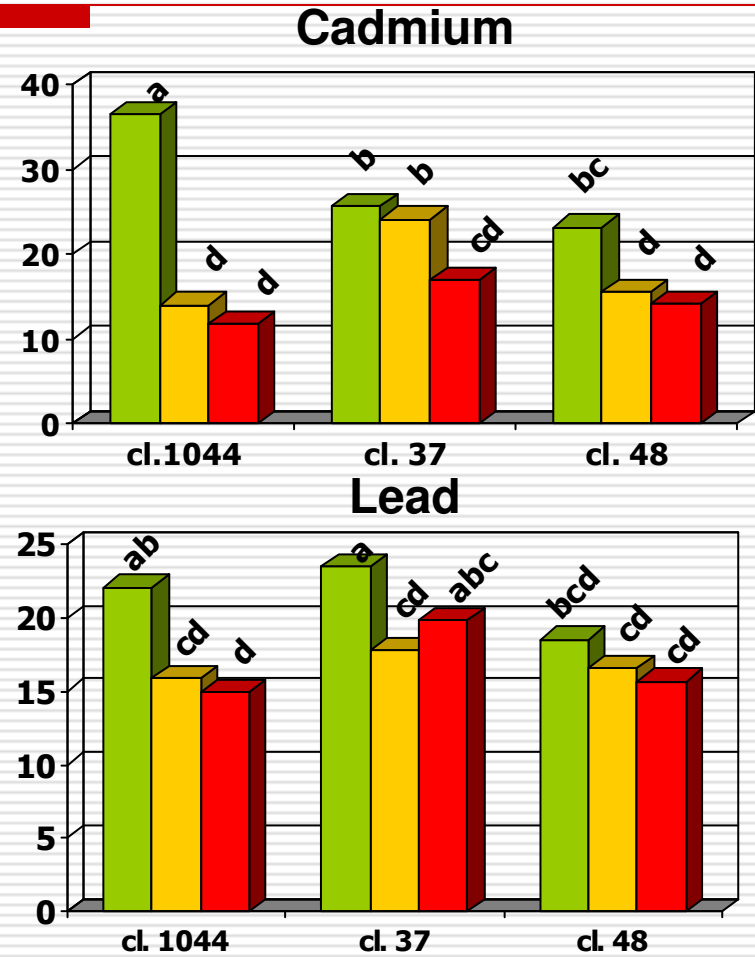
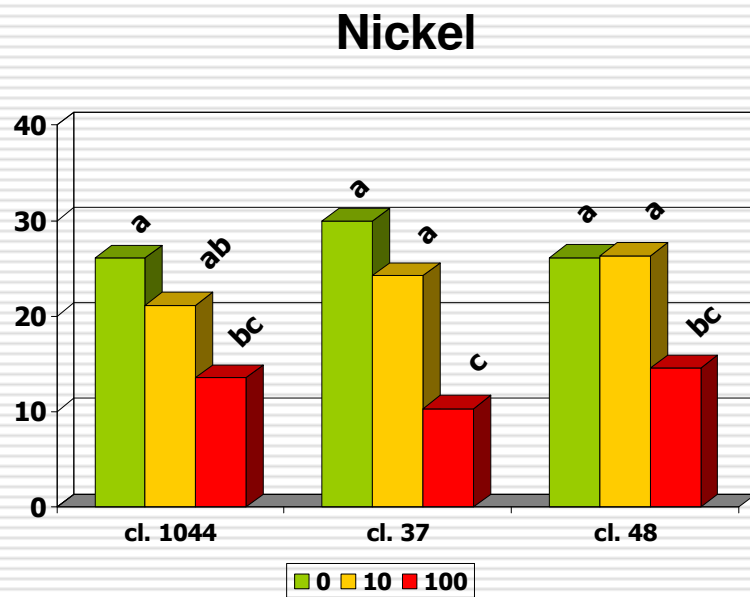
- ❑ Bioconcentration factor (Phytoextraction coefficient)
(Dickinson & Pulford, 2005)

$$BCF = C_{(plant)} / C_{(medium)}$$

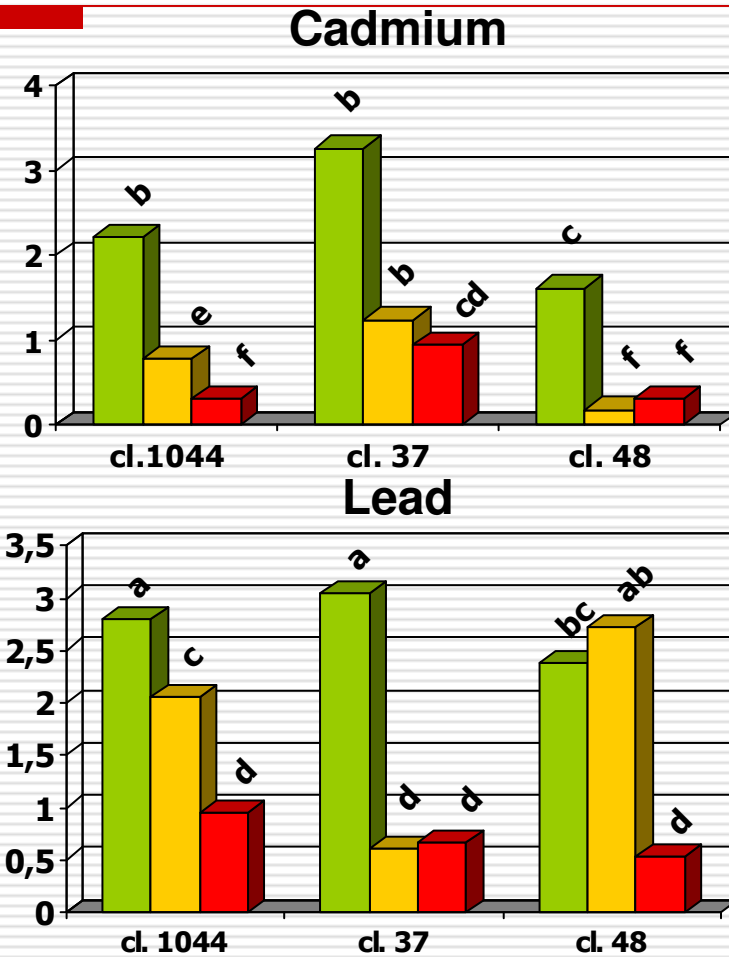
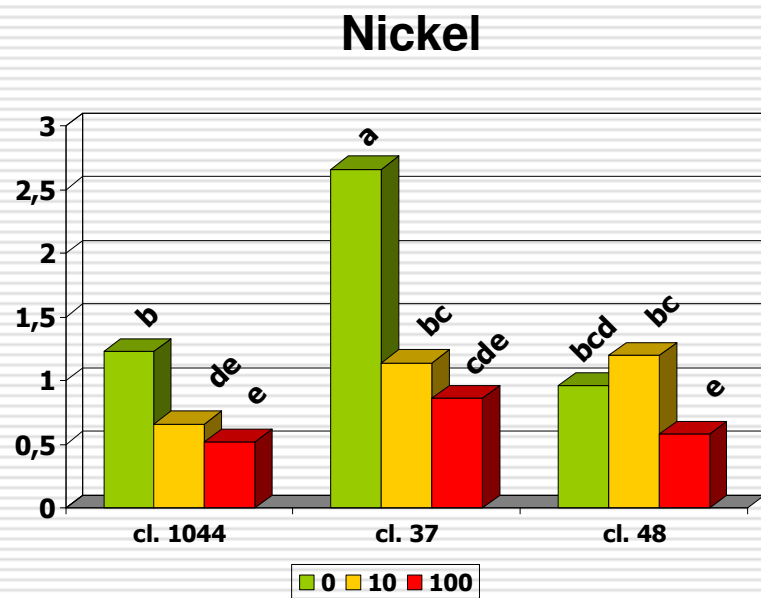
- ❑ BCF = 0-1 🙄

- ❑ BCF > 1 👍

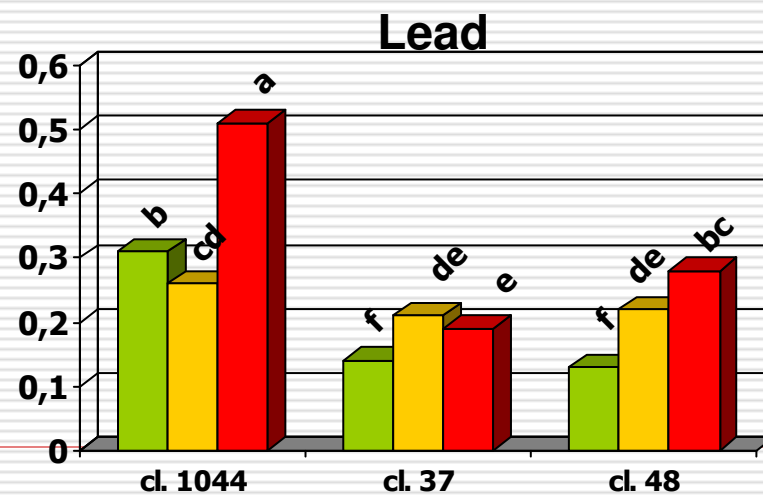
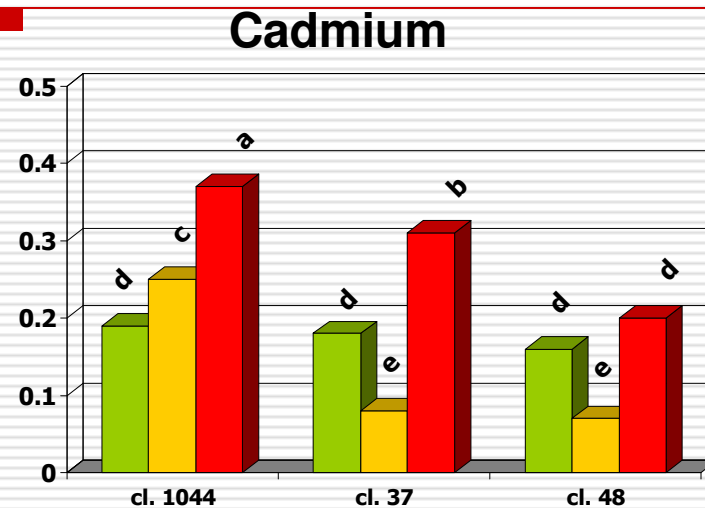
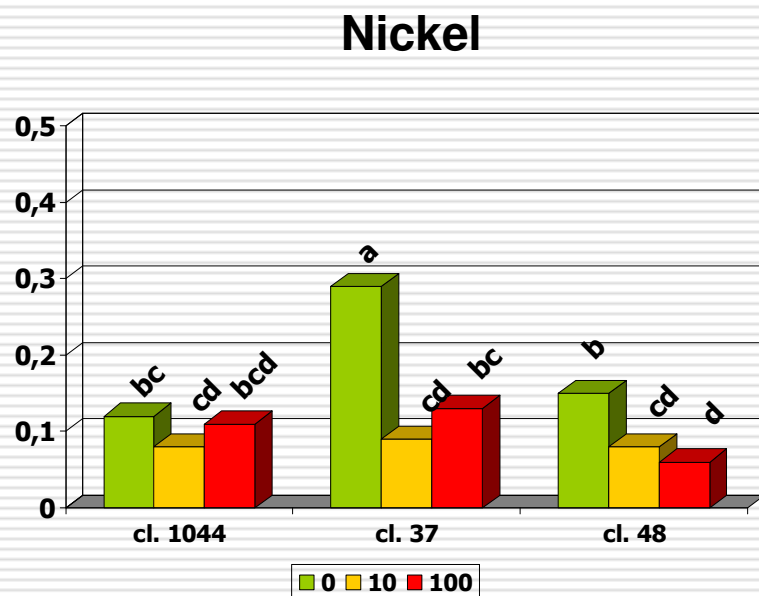
Biomass production M (g_{DW})



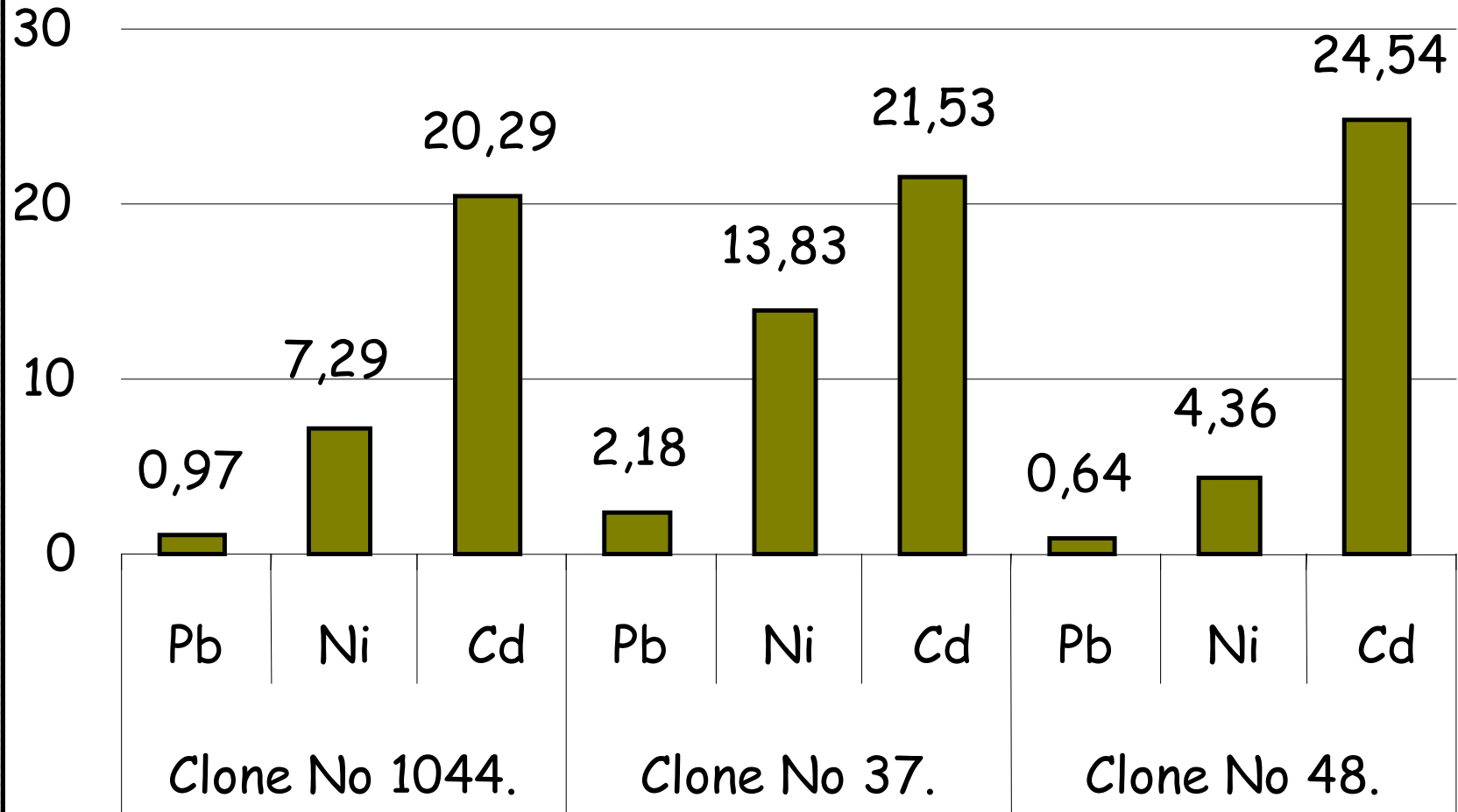
NRA in leaves ($\mu\text{mol NO}_2\text{g}^{-1}\text{DW h}^{-1}$)



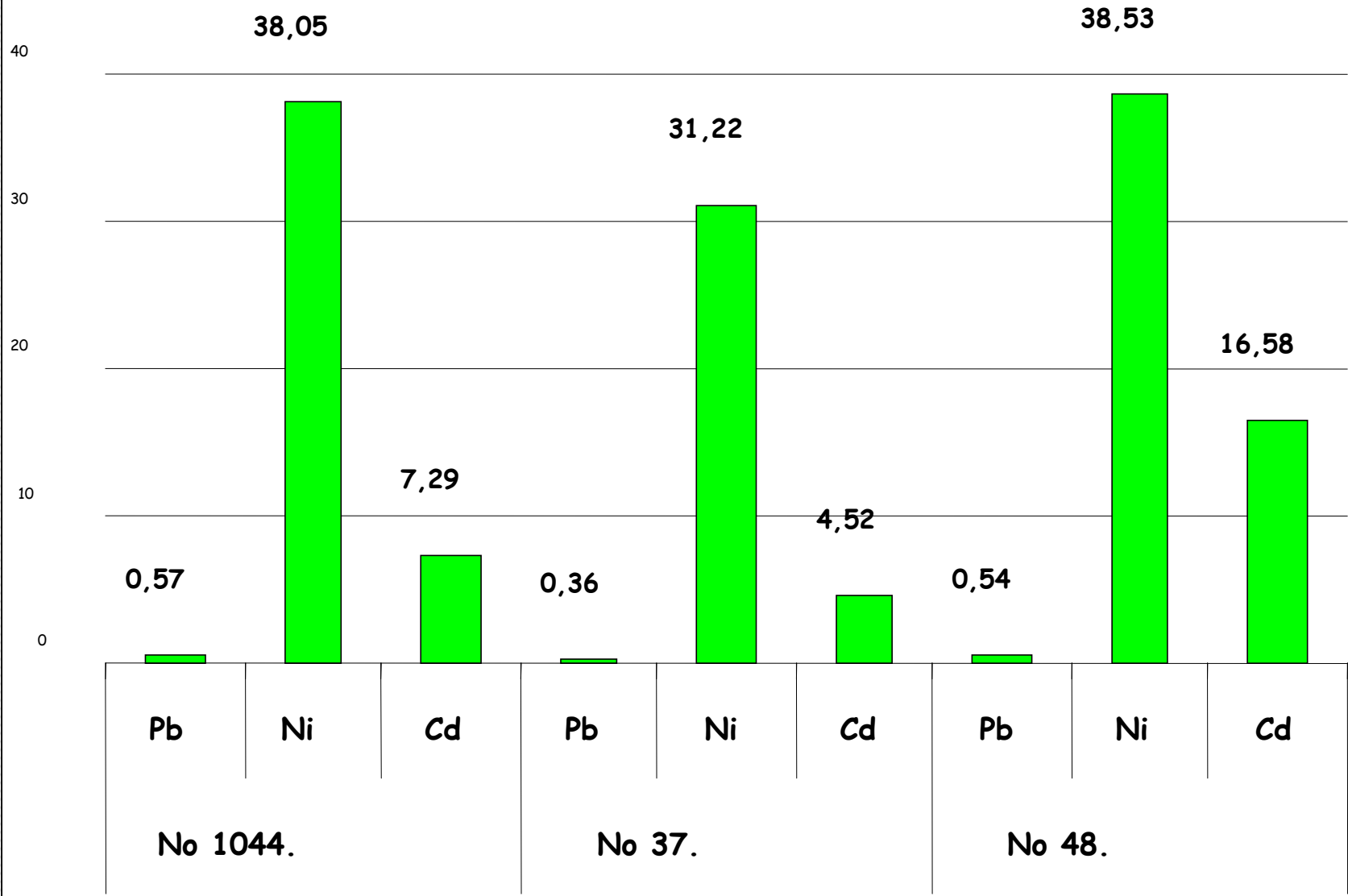
NRA in Roots ($\mu\text{mol NO}_2\text{g}^{-1}_{\text{DW}}\text{h}^{-1}$)



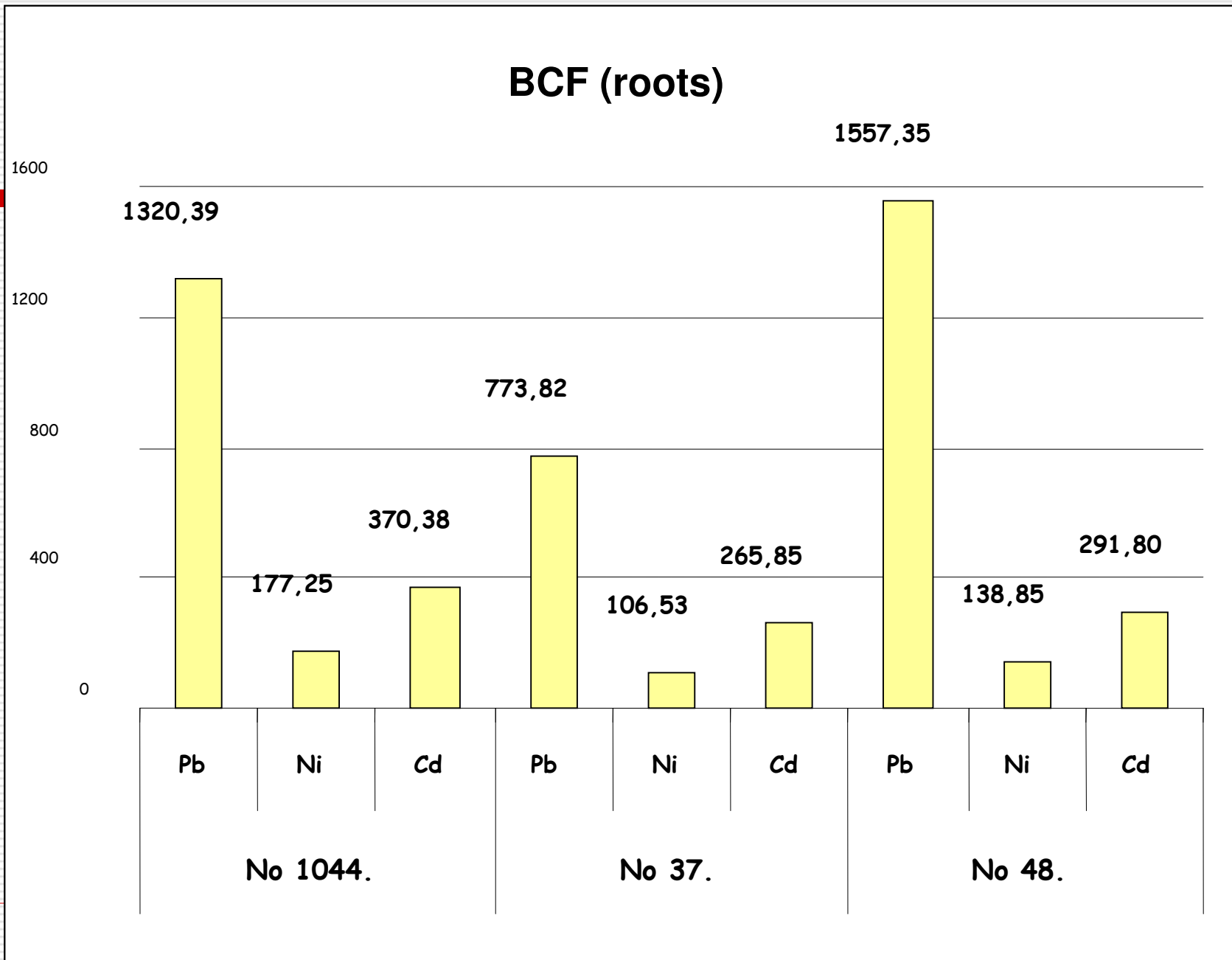
BCF (stem)



BCF (leaf)



BCF (roots)



Conclusions

- ❑ Biomass production was affected by presence of heavy metals
 - ❑ NRA was affected at highest concentrations
 - ❑ Cd phytoextraction → stem
 - ❑ Ni phytoextraction → leaves
 - ❑ Pb phytoextraction → roots
 - ❑ Stem of clone 37 is suitable for phytoextraction of Ni and Pb
 - ❑ Leaves of clone 48 have high BCF of Cd
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Thank you for your attention!!!