4. *Biogeography, Ecology, and Evolution*

Hyperaccumulation of Ni in serpentines of Albania and Continental Greece: what are the trade-off between accumulated elements?

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Over the past decades, reports concerning the hyperaccumulating flora of the Balkans have been published either from herbarium specimens or from field-collected specimens. Most of the reports focused on the single accumulation of Ni. Progressively, other elements have been taken into account when reporting for field-sampled hyperaccumulator plants. Only very recently, it was discovered that Alyssum murale and other Brassicaceae had an extreme accumulation potential for K, although this element is defficient in serpentine soils. After a few surveys in Albania and Continental Greece, we now have a good vision of the hyperaccumulator diversity. We even report a new taxon that had never been mentioned before as a Ni-hyperaccumulator. Two families are present in the ultramafic areas of the two countries (Brassicaceae and Asteraceae) and several genus for the Brassicaceae family (*i.e.* *Alyssum*, *Bornmuellera*, *Leptoplax* and *Noccaea*). Two species of the *Centaurea* genus represent the Asteraceae hyperaccumulators. Continental Greece makes a transition between Turkey and the rest of the Balkan peninsula. We have reported the main characteristics of the fertility of the soils on which they were collected and have analysed full composition of cations in the plant parts (stem, leaves, reproductive parts). Several locations for each taxon are reported whenever possible.

Results clearly indicate different behaviours. Some species (e.g. *Bornmuellera tymphaea* and *Leptoplax emarginata*) are able to accumulate more Ni than others and this seems to be related to a lower Ca uptake. Calcium and potassium are taken up in similar concentrations than Ni and the three elements are always higher than Mg. A reasonable hypothesis to explain the higher levels of Ni accumulation is probably a lower uptake of the other cations (*i.e.* Ca and K) and probably relies on either genetic or phenotypic differences. The identification of the potential of hyperaccumulator taxa for phytoextraction has to be interpretated in a more complete way by analysing the cation absorption balance in whole plants. Soil analysis and level of available Ni, Ca and K has also to be taken into account to fully characterise the environement conditions in which the plant has performed cation accumulation.

Key words: Serpentine, hyperaccumution, calcium, potassium, Centaurea charrellii, Centaurea thracica, cation budget