# STORAGE, LOCALIZATION AND PHYSIOLOGICAL EFFECT OF METAL IN THE NEW NI HYPERACCUMULATOR *ALYSSOIDES UTRICULATA* (BRASSICACEAE)

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Ultramafic soils, often known as "serpentine", are widely distributed all over the world. These substrates are ecological islands with specialised habitats characterized by extreme soils and microclimatic conditions, and often host peculiar animal and plant communities, including many endemic *taxa*, the most notable of which are represented by the nickel hyperaccumulator plants.

The main goals of this study concerns: the identification of new Ni hyperaccumulating *taxa* from serpentinites and the elucidation of mechanisms involved in Ni accumulation in the selected *taxa*.

We performed a plant screening on ultramafic substrates, particularly in Liguria and Piedmont with the field test of dimethylglyoxime (DMG). Positive results were detected only in two Brassicaceae: *Thlaspi caerulescens* J. & C. Presl. and *Alyssoides utriculata* (L.) Medik., where the first is well-known as Ni-hyperaccumulator, while the second has never been recorded for the same attitude.

*A. utriculata.* is a perennial evergreen shrub distributed in the Northeastern Mediterranean area. The species grows on cliffs, debris, screes, and rocks of serpentine areas. In addition, the species shows a biomass higher than other wild Brassicaceae of the same tribe, such as the well-known Ni hyperaccumulator *Alyssum bertolonii.*

In order to understand the capacity of this plant to tolerate metals, in particular Ni, the aboveground and belowground biomass of 5 plants of *A. utriculata*, were collected from 8 serpentine sites, together with the rhizospheric soil (10-15 cm depth).

The results from the field showed that *A. utriculata* hyperaccumulated Ni more than 1000 μg $g^{-1}$ DW in leaves with a high Ni translocation factor (TF>>1). This was confirmed by greenhouse experiments with different Ni levels (0, 10, 100, 500 μg $g^{-1}$). Those controlled experiments showed high plant photosynthetic efficiency (Fv/Fm≥0.8) even in the higher Ni levels. However the performance index (PI) significantly decreased at 500 μg $g^{-1}$of Ni concentration at the end of the treatment (PI = 0.5). Histochemical (DMG 0.1%) and SEM-EDX analyses highlighted the preferential storage of Ni within trichomes, suggesting these as a possible detoxification sites. Increasing Ni concentrations in soil did not significantly affect biomass levels.

To our knowledge this is the first time that this species is referred as Ni hyperaccumulator (Roccotiello, 2011). This plant is potentially important for the phytoremediation of soils contaminated with metals from anthropogenic sources in the Mediterranean habitat.

Roccotiello E., 2011. Caratterizzazione della flora italiana di substrati ultramafici: stato dell'arte e studi finalizzati all'individuazione di nuovi *taxa* iperaccumulatori. Tesi di Dottorato in Botanica Applicata all'Agricoltura e all'Ambiente. Università degli Studi di Genova, XXIII ciclo. 70 pp.

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