

The global population is expected to reach 7 billion by the year 2013. How are we going to feed the world, prevent further degradation of our environment and begin to reverse the damage that our increasingly industrialized society has already caused to the biosphere?

We argue that plants with enhanced mineral acquisition and storage strategies can help us to achieve these goals. Researchers from the United States, through collaborative projects funded by the NSF, are developing crop plants with an augmented capacity to accumulate minerals for sustainable agricultural practices and for improvement of human health through balanced mineral nutrition.

Researchers are also developing plants to accumulate toxic metals from polluted soils and waters for cleanup purposes.

Each of these goals requires understanding how plants accumulate and store minerals. This includes understanding mineral element bioavailability in the rhizosphere and root uptake as well as translocation to and processing in the above ground parts of the plant.

A selection of projects currently funded by NSF that focus on plant ionomics:

IOB 0209777: Arabidopsis 2010 - Collaborative Research: Discovering Transporters for Essential Minerals and Toxic Ions in Plants

MCB 0114748: Arabidopsis 2010: Functional Analysis of the Arabidopsis Yellow Stripe-Like (YSL) Family: Heavy Metal Transport and Partitioning Via Metal-nicotianamine Complexes

IOB 0343975: Phosphate Transport in the Arbuscular Mycorrhizal Symbiosis: Functional Analysis of a *Medicago Truncatula* Mycorrhiza-Specific Phosphate Transporter

IOB 419695: Arabidopsis 2010: The Ionome

IOB 129747: Genome-Wide Hunt for Metal Hyperaccumulation Genes

MCB 0344350: Calcium Signaling in Plants: Analysis of Vacuolar Calcium Transporters and Regulators.

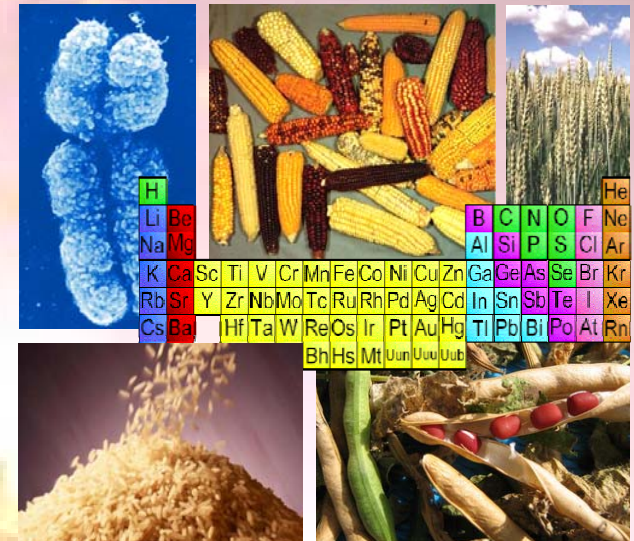
IOB 0416773: *Thellungiella halophila* (Salt Cress), a Halophyte and Cryophyte Arabidopsis Relative as a Genetic Model to Identify Stress Adaptation Determinants

Pamphlet prepared by
David E Salt and Mary Lou Guerinot for:

American Society of Plant Biologists
15501 Monona Drive
Rockville, MD 20855-2768
(301) 251-0560
<http://www.aspb.org>



Genomics to Ionomics Identifying plant genes to enhance human mineral nutrition and health



National Science Foundation (NSF)-funded research is extending our basic knowledge of how plants control accumulation of minerals important for human health. This knowledge is enabling the development of new crop cultivars with improved nutritional qualities, enhanced agricultural properties, and plants for restoration of metal-polluted environments.

