1. Record Nr. UNINA9910876576803321

Titolo	Plant solute transport / / edited by Anthony Yeo, Tim Flowers
Pubbl/distr/stampa	Oxford ; ; Ames, Iowa, : Blackwell Pub., 2007
ISBN	1-281-32029-3 1-282-12394-7 9786612123948 9786611320294 0-470-98886-X 0-470-99427-4
Descrizione fisica	1 online resource (434 p.)
Classificazione	42.43
Altri autori (Persone)	YeoA. R FlowersT. J (Timothy J.)
Disciplina	571.2
Soggetti	Plant translocation
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Plant Solute Transport; Contents; Preface; Contributors; 1 General introduction; 1.1 Introduction; 1.2 Synopsis; 1.3 Concluding remarks; Reference; 2 Solutes: what are they, where are they and what do they do?; 2.1 Solutes: inorganic and organic; 2.2 Analysis of inorganic elements; 2.2.1 Obtaining material for analysis; 2.2.2 Optical methods; 2.2.3 Mass spectrometry; 2.2.4 X-ray fluorescence; 2.2.5 Ion-specific electrodes; 2.2.6 Ion chromatography; 2.3 Solute concentrations; 2.4 Organic compounds; 2.5 Range of solutes found in plants; 2.6 Localisation; 2.6.1 Stereological analysis 2.6.2 Inorganic elements and electron microscopy2.6.3 Ion-specific microelectrodes; 2.6.4 Direct sampling; 2.6.5 Use of fluorescent dyes; 2.6.6 Flux analysis; 2.6.7 Organic compounds; 2.7 What do they do?; 2.7.1 Vacuoles; 2.7.2 Organelles and the cytoplasm; 2.7.3 Cell walls; 2.7.4 Conclusions; References; 3 The driving forces for water and solute movement; 3.1 Introduction; 3.2 Water; 3.3 Free energy and the properties of solutions; 3.3.1 Free energy and chemical potential; 3.3.2 Water potential and water potential gradients; 3.3.3 Osmosis and colligative properties; 3.4 Cell water relations

3.5 Water movement3.5.1 Water movement through the soil; 3.5.2 Water in cell walls; 3.5.3 Water movement across a root (or leaf); 3.5.4 Water movement through the xylem and phloem; 3.6 Solute movement; 3.6.1 Chemical, electrical and electrochemical potentials and gradients; 3.6.2 Diffusion - Fick's first law; 3.6.3 Diffusion potential; 3.6.4 Nernst potential; 3.6.5 Donnan systems; 3.6.6 Goldmann equation; 3.7 Coupling of water and solute fluxes; References; 4 Membrane structure and the study of solute transport across plant membranes; 4.1 Introduction; 4.2 Plant membranes
4.2.1 Plant membrane composition4.2.2 Plant membrane structure; 4.3 Studying solute transport across plant membranes; 4.4 Transport techniques using intact or semi-intact plant tissue; 4.4.1 Plant growth; 4.4.1.1 Solution design; 4.4.1.2 Using inhibitors; 4.4.2 Accumulation and net uptake; 4.4.3 Radioactive tracers; 4.4.4 Fluorescent solute probes; 4.4.5 Electrophysiology; 4.4.5.1 Voltage-based measurements (membrane potential and ion concentration); 4.4.5.2 Voltage clamping; 4.5 Using isolated membranes for transport studies; 4.5.1 Isolating membranes
4.5.2 Assaying transport activities of protoplasts and membrane vesicles4.6 Using molecular techniques to inform transport studies; 4.6.1 Revealing the molecular identity of transporters and testing gene function; 4.6.2 Location of transport proteins; 4.6.3 Heterologous expression; 4.7 Combining techniques (an example of increasing resolution and physiological context); 4.8 Future development; 4.9 Conclusions; Acknowledgements; References; 5 Transport across plant membranes; 5.1 Introduction; 5.1.1 Plant solutes; 5.1.2 Definitions and terminology; 5.1.3 Some formalisms; 5.2 Passive transport
5.2.1 Diffusion through membranes

Sommario/riassunto

This book provides a broad overview of solute transport in plants. It first determines what solutes are present in plants and what roles they play. The physical bases of ion and water movement are considered. The volume then discusses the ways in which solutes are moved across individual membranes, within and between cells, and around the plant. Having dealt with the role of plant solutes in 'normal' conditions, the volume proceeds to examine how the use of solutes has been adapted to more extreme environments such as hot, dry deserts, freezing mountains and saline marshes. A crucial stage in