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Functional Plant Biology

Contents

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Special Issue: Halophytes

Cover illustration: Energy and metabolite flow in photosynthesis (see Koyro *et al*. pp. 787–804). Branching points of the photosynthetic pathway essential for efficient energy use are indicated and numbered. Ribbon shaped arrows show regulatory effects such as re-arrangement of membrane protein structures (green and red), redox control of Calvin cycle enzymes (blue), metabolite (sugars and sugar phosphates) control of gene expression (orange). Since the number of coenzyme molecules inside a chloroplast, for instance, is limited, when the absorption of light quanta is high, we have to consider turnover as well as transport rates of intermediates. Diagram by Hans-Werner Koyro, Christian Zörb, Ahmed Debez and Bernhard Huchzermeyer.

Tolerance of extreme salinity in two stem-succulent halophytes (*Tecticornia* species) ***Jeremy P. English and Timothy D. Colmer***	897–912	Some stem-succulent halophytes inhabit areas of very high salinity, such as inland salt lakes. Tolerance and physiological responses to extreme salinity (2000 mM NaCl) were evaluated for two *Tecticornia* species; both were highly tolerant. Growth patterns of halophytic species on the margins of salt lakes are likely influenced both by soil salinity and water availability (periodic floods and water deficits).
Review: Bioaccumulation of heavy metals in *Spartina* ***Susana Redondo-Gómez***	913–921	Heavy metal pollution is a major environmental problem that is rapidly gaining importance due to its impact on human health through the food chain. Phytoremediation is considered an effective, low cost, preferred cleanup option for moderately contaminated areas. In this context, the available literature on heavy metal bioaccumulation by *Spartina* sp. was compiled and compared.
Halophyte anti-oxidant feedback seasonality in two salt marshes with different degrees of metal contamination: search for an efficient biomarker ***Bernardo Duarte, Dinis Santos and Isabel Caçador***	922–930	In contaminated estuaries, halophytes can be subjected to high levels of metal contamination that inevitably affect their metabolism, namely, their anti-oxidant systems. Considering the more abundant halophyte species in Tagus estuary salt marshes, *Spartina maritima* proved to be potentially efficient biomonitor species. Also its enzymatic anti-oxidant system revealed a substantial increase of activity under contaminated conditions. Considering this, *Spartina maritima* and its anti-oxidant enzymatic defences arise as potential biomonitor species and biomarker for heavy metal contamination studies.
Halophytes as sources of metals in estuarine systems with low levels of contamination ***Thiago Couto, Bernardo Duarte, Dimitri Barroso, Isabel Caçador and João C. Marques***	931–939	In this work the metal concentration in three plant species (*Scirpus maritimus, Spartina maritima* and *Zostera noltii*) of the Mondego Estuary in Portugal was analysed. From the concentration of metals in the aboveground and belowground organs and in the sediment it was possible to conclude that the Mondego Estuary, although having a low level of contaminants, could be a source of metals for nearby aquatic systems.
Review: Properties of the halophyte microbiome and their implications for plant salt tolerance ***Silke Ruppel, Philipp Franken and Katja Witzel***	940–951	Plant-inhabiting micro-organisms have a crucial impact on plant growth and health. Specialised bacterial and fungal communities live inside and on the surface of halophytes and may significantly contribute to the salt tolerance of their host. This review analyses the opportunity that the native microbial world offers crop plants to enlarge their growing space into salt affected areas.
Review: An economic point of view of secondary compounds in halophytes ***Anne Buhmann and Jutta Papenbrock***	952–967	A broad variety of secondary compounds of economic interest is present in halophytes, with potential uses in various fields such as pharmaceuticals and nutraceuticals. Salt-tolerant plants are potential sources of valuable products that are largely unexploited. Our overview identifies open research questions and gives suggestions for future applications of secondary compounds of halophytes.
The importance of iron supply during repetitive harvesting of *Aster tripolium* ***Yvonne Ventura, Malika Myrzabayeva, Zerekbay Alikulov, Shabtai Cohen, Zion Shemer and Moshe Sagi***	968–976	In an attempt to develop *Aster tripolium* L. as a halophyte vegetable for saline irrigation on dune sand, it was observed that sequential harvesting resulted in leaf chlorosis, yield reduction, reduced nitrate reductase activity (NRA) and enhanced nitrate concentration. Application of suitable Fe-chelates restored leaf colour, NRA and nitrate content indicating that NRA can be an indicator for iron deficiency in *A. tripolium*.