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Nota di contenuto	Antioxidants and Reactive Oxygen Species in Plants; Contents; Contributors; Preface; 1 Glutathione; 1.1 Introduction; 1.2 The glutathione redox couple and cellular redox potential; 1.3 Glutathione metabolism; 1.4 Biosynthesis and inhibition by L-buthionine-SR-sulphoximine; 1.5 Glutathione and the cell cycle; 1.6 Glutathione in leaves and its relationship to chilling tolerance; 1.7 Glutathione and homoglutathione in the regulation of root and root nodule development; 1.8 Transport and transporters; 1.9 Glutathione and signalling; 1.10 Conclusions and perspectives 2 Plant thiol enzymes and thiol homeostasis in relation to thiol-dependent redox regulation and oxidative stress2.1 Introduction: plant sulfur and thiol contents; 2.2 The redox potential and its relation to the redox proteome; 2.3 Oxidation of thiol groups; 2.4 C-X-X-C and C-X-X-S motifs in redox proteins; 2.5 The principle reactions that maintain thiol-redox homeostasis; 2.6 Enzymes involved in thiol-disulfide interconversion; 2.6.1 Thioredoxins; 2.6.2 Glutaredoxins; 2.6.3 Omega

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2.7 Peroxiredoxins, thiol/disulfide proteins in antioxidant defence2.7.1 1-Cys Prx; 2.7.2 2-Cys Prx; 2.7.3 Prx Q; 2.7.4 Type II Prx; 2.8 The thiol proteome of plants; 2.9 Thiol homeostasis in subcellular compartments; 2.10 Thiol-dependent redox regulation of gene expression; 2.11 Linking thiol regulation to metabolic and developmental pathways; 2.12 Outlook; 3 Ascorbate, tocopherol and carotenoids: metabolism, pathway engineering and functions; 3.1 Introduction; 3.2 Ascorbate; 3.2.1 Distribution and subcellular localisation; 3.2.2 Ascorbate biosynthesis; 3.2.3 Ascorbate recycling
3.2.4 Ascorbate and dehydroascorbate transport across membranes3.2.5 Enzymes involved in ascorbate oxidation; 3.2.6 Ascorbate catabolism; 3.2.7 Control of ascorbate synthesis and metabolic engineering; 3.2.8 The functions of ascorbate; 3.3 Vitamin E: tocopherols and tocotrienols; 3.3.1 Isoprenoid antioxidants; 3.3.2 Structure and antioxidant activity of tocopherols and tocotrienols; 3.3.3 Functions of tocopherol; 3.3.4 Biosynthesis of tocopherols and tocotrienols; 3.3.5 Control and engineering of tocopherol and tocotrienol biosynthesis; 3.4 Carotenoids; 3.4.1 Carotenoids as antioxidants
3.4.2 Carotenoid biosynthesis and metabolic engineering4 Ascorbate peroxidase; 4.1 Enzymatic removal of hydrogen peroxide in plants; 4.2 Functional analysis of APX; 4.3 APX structure; 4.3.1 Overall structure; 4.3.2 Active site structure; 4.3.3 Substrate binding; 4.4 Evolution of APXs; 4.5 Summary; 5 Catalases in plants: molecular and functional properties and role in stress defence; 5.1 Introduction; 5.2 Biochemistry and molecular structure of catalases; 5.2.1 Types of catalases; 5.2.2 Molecular structure; 5.2.3 Mechanism of the catalytic reaction and kinetic properties
5.3 Occurrence and properties of plant catalases

Sommario/riassunto

Reactive oxygen species (ROS) are produced during the interaction of metabolism with oxygen. As ROS have the potential to cause oxidative damage by reacting with biomolecules, research on ROS has concentrated on the oxidative damage that results from exposure to environmental stresses and on the role of ROS in defence against pathogens. However, more recently, it has become apparent that ROS also have important roles as signalling molecules. A complex network of enzymatic and small molecule antioxidants controls the concentration of ROS and repairs oxidative damage, and research is revealing t