Water Transport in Plants under Climatic Stress
Water Transport in Plants under Climatic Stress

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Editors' preface

An important International Workshop was held at the Vallombrosa Abbey, in the Forest of Vallombrosa, near Firenze, Italy, 29-31 May 1990. Eighty scientists participated in a discussion of water transport in plants. There have been many international workshops and conferences on plant-water relations but this was the first to focus on the failure of the hydraulic pathway within the xylem. It was possible to assemble practically all those scientists, worldwide, who have worked on the cavitation of water in the transport system. This phenomenon of cavitation, which was discovered only in the 1960s, is now being recognized as being widespread. It occurs in all the species of vascular plant so far examined, and can usually be detected on any summer's day. Its ecological significance is a matter for further research, but many consider that embolism in the xylem predisposes plants to further water stress, so that cavitation and refilling may hold the key to vegetational response to climatic warming and drying.

At the meeting it was resolved to prepare a manuscript for publication and this process (with peer review and revision) took place during 1991.

Papers presented fall naturally into several subject groupings:
(i) analysis of the mechanism and pathway of water flow in the plant,
(ii) the natural repair of the hydraulic continuum, whereby emboli are redissolved in water,
(iii) survey of methodologies including acoustic detection of cavitation, thermoelectric techniques and nuclear magnetic resonance, and
(iv) case studies, examples of current work, mainly in the hot dry climates of the southern Mediterranean.

The workshop was sponsored by local, national and European organisations, without which the meeting would not have taken place. These were the Commission of the European Community, the Consiglio Nazionale delle Ricerche, the Society of Experimental Biology, the British Ecological Society and the Centro Studi per l'Informatica in Agricoltura (Firenze). In addition we received valuable support from the Vallombrosa Abbey, Comune di Reggello and Fondazione Scienza per l'Ambiente.

We are particularly grateful to S. Bianchi, P. Cioni, J. Gallori and F. Giannini who worked to ensure the smooth running of the workshop and, finally, to Dr. R. Tognetti who assisted us tirelessly in the editorial work.