

Cluster Roots: Their Physiology, Ecology and Developmental Biology

Four papers given at the XVI International Botanical Congress, St Louis, USA, August 1999
in a session entitled

Cluster Roots: Their Physiology, Ecology and Developmental Biology

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Cluster roots, or proteoid roots, are important adaptations for nutrient acquisition, found in a wide range of plant families, in both Northern and Southern Hemispheres and in regions of significant biodiversity. Resembling bottlebrushes, these structures consist of tight groupings of determinate rootlets. They are thought to provide an alternative means of phosphate acquisition to mycorrhizas. Research has been increasing into the biochemical and physiological foundations of the exudative burst, a 2–3 d period of intense exudation, when protons and organic acids are released into the rhizosphere at extremely high levels. The developmental biology of cluster roots, in terms of root initiation and meristem determinancy, also pose many questions of great relevance to central themes in modern biology—the control of the cell cycle and the basis of pattern formation. The roles of cluster roots in agroforestry and in ecosystem remediation also deserve further investigation, as does the potential to transform other species to produce cluster roots. With increasing pressures to reduce fertilizer additions, cluster roots provide an important option for phosphate acquisition.

In 1999, the first international symposium on cluster roots was held in St Louis, USA as part of the XVI International Botanical Congress. Bringing together many of the leading workers in the field, a series of papers was presented that covered pure and applied research into the ecology, evolution, developmental biology, function and utility of these fascinating structures. This symposium was kindly sponsored by the *Annals of Botany*. Four of the papers are presented here. In addition to providing reviews of current knowledge, each paper also presents exciting new findings in this ever-expanding area. Finally, challenges for the future are outlined. It is hoped that this collection of papers will stimulate more interest in cluster roots.

Keith R. Skene