



Edited by  
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# Progress in BOTANY

Genetics  
Physiology  
Systematics  
Ecology

 Springer

# Progress in Botany

Volume 69

## Series Editors

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# Progress in Botany 69

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## **Review**



## Curriculum Vitae

- 1936** Manfred Kluge was born in Zschopau (Saxonia; Germany)
- 1957** Graduation from the Gymnasium
- 1957–1962** Undergraduate studies at the University of Frankfurt and the Darmstadt University of Technology in Biology, Chemistry and Geography. Examination for Teachers Profession (Gymnasium) in 1962
- 1962–1964** Graduate student in Botany with Professor Hubert Ziegler at the Darmstadt University of Technology
- 1964** Doctor's degree (Faculty for Chemistry, Biology and Geosciences of the Darmstadt University of Technology), Scientific Assistant at the Institute of Botany in Darmstadt
- 1966** Married to Helga Müller, also graduate student of Hubert Ziegler
- 1969** Habilitation (Botany) at the Darmstadt University of Technology, Lecturer at the Institute of Botany; birth of son Christoph
- 1970** Birth of son Andreas, Postdoctoral Research Fellow at the Australian National University, Canberra
- 1971–1973** Associate Professor at the Institute of Botany of the Technical University Munich
- 1974** Full Professor of Botany, Faculty Biology of Darmstadt University of Technology
- 2002** Retirement

1985 Guest Professor at the Botany Department of the National University Singapore. 1989, 1991 and 1993 Guest Docent of the German Academic Exchange Service (DAAD) at the Botany Department of the University Antananarivo (Madagascar). Repeatedly elected Director of the Institute of Botany and the Botanical Gardens of the Darmstadt University of Technology and Dean of the Faculty of Biology of this University. Chairman of the DFG Schwerpunktsprogramm “Biochemical fundaments of ecological adaptation in plants”(1974–1979), and the DFG Graduate School 340 “Communication in biological systems: from the molecule to the organism in its environment”; Vice Chairman of the DFG Center of Excellence 199 “Molecular ecophysiology of plants: acquisition of resources, membrane transport, regulation of resource consumption”. Tutor of the Studienstiftung des Deutschen Volkes at the Darmstadt University of Technology (1976–2003).

# Ecophysiology: Migrations Between Different Levels of Scaling

Manfred Kluge

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**Abstract** Causal explanation of the mechanisms behind ecological adaptation in plants requires research on different levels of scaling, ranging from molecules to plants in their natural environment. In the following article this is illustrated by a description of the author's scientific life-work mainly with respect to the crassulacean acid metabolism (CAM) and research on *Geosiphon*, an endosymbiotic consortium of a fungus and a cyanobacterium.

## Introduction

The title chapters of *Progress in Botany* provide a forum where in the past celebrities of the plant sciences explored important fields of their scientific life-work. Thus, the invitation by the Editors of *Progress in Botany* to write the title chapter of

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