

Diversity of ecophysiological strategies in succulents: examples from Southern Africa

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A large number of succulent species and a high biodiversity are typical for the arid and semi-arid zones of Southern Africa, especially in the Succulent Karoo, a winter rainfall desert in north-western South Africa. These succulents have developed various integrated and co-adapted morphological and ecophysiological features that maximise their chances of surviving the detrimental conditions in arid habitats. The development of succulence and the accumulation of ions are examples for such ecophysiological strategies. CAM is a common feature in various southern African succulent plant families and especially in the Aizoaceae. CAM is not always a constant feature. CAM may be expressed in different ways such as CAM-cycling with a C_3 -like gas exchange pattern but nocturnal malate and citrate accumulation accompanied by fixation of respiratory CO_2 , or flexible shifts between CAM, CAM cycling, and CAM-idling. The evolutionary background and origin of the CAM mode within a plant group and its correlation with plant functional types, however, have not been investigated up to now and remained nearly unknown. In this paper, we report about the ecophysiological strategies in southern African succulents and their relations to phylogenetic patterns and plant functional types (Fig. 1).

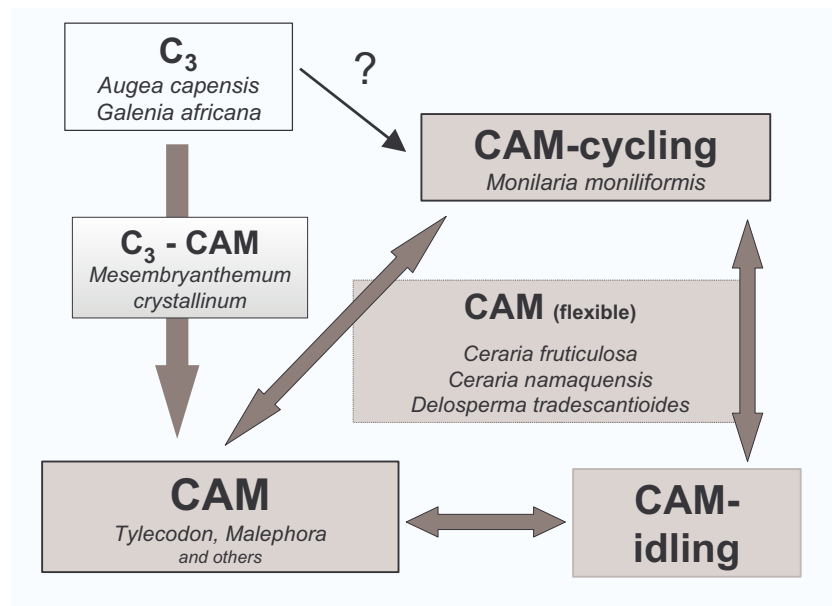


Fig. 1: Scheme of photosynthetic types in southern African succulents.

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