

SIMILARITIES AND DIFFERENCES OF ECOSYSTEMS
IN MEDITERRANEAN AUSTRALIA AND SOUTHERN
AFRICA, WITH SPECIAL REFERENCE TO INFERTILE
SITES AT THE BARRENS AND THE CALEDON COAST

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I declare that this thesis is my account of research done while registered at Murdoch University and has not previously been submitted for a degree at any University

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Abstract

Similar ecosystems may be expected where climates and landforms on different continents match. The most detailed tests of such convergence have examined mediterranean areas of Europe, North and South America. This thesis compares mediterranean Australia and southern Africa, two relatively nutrient-poor areas largely neglected in previous studies. In particular, two study areas very similar in climate, landform and soils were compared, one at the Barrens on the south coast of Western Australia and the other at the Caledon coast in the southwestern Cape of South Africa.

The less frequent, but heavier, rain in Australia probably led to the anomalous presence of trees there. The height and density of vegetation appeared only weakly related to soil nutrients but strongly correlated with moisture. Conversely, nutrient status rather than climate appeared to govern many of those features of plants that interacted with animals, such as flowers and fruits. This applied particularly to ants, which took seeds bearing elaiosomes, and birds, which took fleshy fruits. Soil fertility thus determined the occurrence of agents which both consumed plants and aided their propagation. Climate, soil and fire, together with the consequent regimes of nutrient cycling and predation, determined the relative roles played by endotherms, such as mammals, and by ectotherms, such as reptiles, amphibians and their invertebrate prey.

Despite close matching, small differences in physical factors remained between the two study areas, with commensurate differences in their biological communities. It is suggested

that co-adaptation is not a major cause of differences between ecosystems on different continents but rather a consequence of inevitable differences in physical conditions.

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