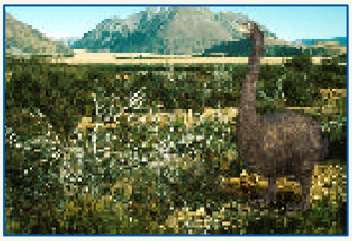
Ecology / Physiology

Ecophysiology



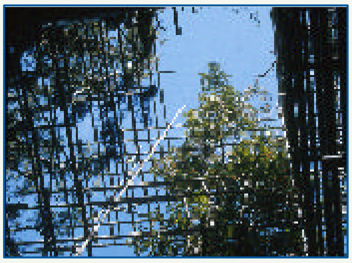
NZ Divaricate Plants – Moa or Harsh Environment?

The New Zealand flora is remarkable for its high frequency of shrubs with highly tangled branches (divaricate). In the past this frequency was attributed to moa browsing, which was supposedly reduced by the dense branching. However, we have shown that some divaricates, by shielding their functional leaves within an outer screen of branches, avoid high-light inhibition of photosynthesis. This apparently architectural strategy for photoprotection is an intriguing aspect of the biology of these plants. This research, supported by the Marsden Fund, is investigating the physiological mechanisms underlying this unique growth form, by addressing the overall hypothesis that the divaricating plant habit ensures maximum photosynthetic production by minimizing the damaging effects of high light loads on photosynthesis.



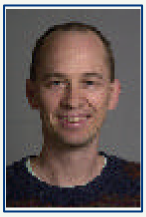
Forest Ecophysiology

Forests store large amounts of carbon that they absorb from the atmosphere as carbon dioxide (CO_2). They also contain much of the earth's biodiversity. Despite the significance of native forests to national and global carbon budgets, very little is known about the precise mechanisms regulating carbon exchange. Even less is known about the capability of our forests to act as a carbon sink with changing climate. This research, conducted in collaboration with colleagues at Landcare Research, Lincoln, is investigating above and below ground soil and plant processes in the carbon balance, and the environmental and biological variable regulating them.



Global Change Biology

Scientists now agree that release of greenhouse gases as a result of human activities is changing our climate. Our ability to judge how such changes will influence the world's ecosystems will be based on our understanding of the release and uptake of carbon dioxide by plants (e.g. forests). The net storage of CO_2 by forest ecosystems is determined by the interaction between biological processes and environmental factors and is thus likely to be modified by human-induced climate change. This conducted in collaboration with colleagues at the Biosphere 2 Research Facility in Arizona is investigating factors influencing the rate at which forested ecosystems take up CO_2 from the atmosphere. This research contributes to a global research effort to understand plant and ecosystem photosynthesis and respiration in response to global change. It hopes to make progress in scaling thes important but poorly understood processes from the leaf/plant level to the whole ecosystem level – an important challenge in our efforts to predict the likely effects of global climate change.



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