

Dr Udo Benecke 1 April 1940 – 15 April 2015

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Udo came to New Zealand in 1962 after completing his forestry degree at the University of Aberdeen. His first job with the Forest Service was in the Central North Island working with radiata pine. Later he moved to the Forest Research Institute in Rangiora and worked on vegetation/catchment surveys from 1963 to 1967. Outside the surveys he developed his own research fields which involved studies of:

- The spread of contorta pine and its control by pasture improvement and intensity of sheep grazing
- The growth of mycorrhizas on contorta pine planted on eroded sub-soil
- The phenology of pines and mountain beech planted at four elevations in the Craigieburn Range
- A large provenance trial involving seedling conifers and beech growing in containers at the timberline and at Rangiora to determine which origins were best for use on eroded soils.

He was intrigued by the growth of the European green alder planted on scree and its ability to fix nitrogen in root nodules and to take up phosphorus through ectotrophic mycorrhizas. In a Masters study at Lincoln College he used isotopes of nitrogen and phosphorus to track their uptake in alder roots. That early work in the field and laboratory developed Udo's confidence in undertaking research. In the 1970s he began a doctorate thesis in Germany to determine how canopy processes of photosynthesis, respiration and transpiration interact in the growth of larch.

On his return to New Zealand he set up a mobile laboratory equipped with climatized cuvettes to track gas-exchange processes and growth in the conifers and beech he had earlier established at different altitudes in the Craigieburn Range. These studies produced detailed data on the ability of the trees to control water use, 'frost drought' in beech (where warm days in winter allow stomata to open and transpire but cold roots restrict water uptake), and on the adaptation of trees to local climate at the four elevations. These field studies



were followed up with specimens grown in defined climates in a phytotron (wind tunnel) in Austria.

In the 1980s the gas-exchange laboratory was moved to Big Bush in Nelson to measure growth processes and water use in hard beech, radiata pine and understory ferns in catchments set up to estimate water output from forests at different stages of management. At the end of these studies Udo had completed 20 years of exacting field ecophysiology with a very competent team. His

knowledge and global interests took him to many interesting forests:

- Working in Nepal to guide the Himalayan Trust on how to manage timberline forests in the Mt Everest National Park
- Studying forests in Turkey and reporting through Lincoln International to the World Bank on the direction of forest research there
- Going to Chile to study relict stands of timberline Fitzroya and visiting New Caledonia to view stands of Araucaria
- Studying species-rich forests in Sichuan, China
- Organising tours for New Zealand foresters to view forests in Germany that were managed for continuous cover, and helping to coordinate scientist exchanges between Germany and New Zealand.

Udo was greatly concerned about how ecosystems might adapt to increasing atmospheric carbon dioxide and to global heating. His broad interests led him to Ecuador and the Galapagos Islands to observe the evolving flora and fauna as the ecosystems developed and declined over time.

Udo died in Ecuador from an aortic aneurism. His wife, Jennie, was with him. He is survived by Jennie, his sons Heiner and Marcus, his daughter Katrina, and his mother Molli.