

Preface

The focus of the Trees and Soils Workshop, held at Lincoln University in March 1994, was on designing long-term trials to study the effects of trees on soil properties.

Although the long-term sustainability of forests and other forms of land use are not new issues, scientists are increasingly being asked to supply quantitative information on which to base practices. In particular, while foresters often assume that plantations are a sustainable use of land, their views are questioned by many outside the forestry industry. Subsequent to the workshop this was illustrated by a review by Greenpeace of New Zealand plantation forestry.

There are a number of aspects related to forest management as they influence biological sustainability. Many recent studies have concentrated on the impact of forest practices such as harvesting. But what about the effects of the trees themselves? Traditional forestry literature suggests that pines are worse than hardwoods—and in some countries the planting of eucalypts has been questioned.

A number of researchers have addressed this question over the years, but most of the studies are retrospective in nature, or are perhaps based on chronosequence studies (which are a time sequence of a retrospective nature: see Dyck and Cole 1994 for a review). The central problem with such studies is that the 'treatments' are not under the control of the investigator. Inferences are therefore correlative and indirect. While results are obtained quickly, they often lack the certainty and flexibility of designed experiments. Other problems can include poorly defined controls, limited choice of treatments, problems associated with soil variability, and uncertainty about causal agents. Chronosequence studies usually do not suit themselves to process studies.

Reviews of retrospective research in forestry conclude that, because of these limitations, at the very least the implications from such studies must be tested in well-designed planned experiments.

It is the design of such experiments that we addressed at this workshop. Lincoln University is planning to promote the establishment of trials to compare a range of tree species (see Mead, this volume). Such trials by their very nature will be a long-term commitment of a large area of land and other resources for perhaps 50 years or more. The institutions funding such trials need to be sure that researchers have thought through all aspects of the design process from defining objectives to ensuring the experiments will provide clear results.

Long-term trials must be well planned. We need to set clear questions and try to ensure that these questions are timeless—that they will still be relevant after several decades. Then there are technical design aspects that need to be addressed. For example, how should the species in the experiment be chosen? How large should the plots be and what replication will be required? How should we tend trials with species with contrasting growth habits? What should we do about understorey vegetation, thinning, diseases and so forth? And what vegetation, soil and climatic parameters should we be measuring?

The objectives of this report on the workshop are twofold:

1. to review experience with planned experiments that compare species and their effects on soils; and
2. to produce a protocol for a designed experiment to be established at Lincoln University to compare the effects of trees on soils. This was the final outcome of the various discussion sessions.

We hope that readers and users of this special issue will support more research in this area of forest sustainability.

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Reference

Dyck, WJ and Cole, D W. 1994. Strategies for determining consequences of harvesting and associated practices on long term productivity. In *Impacts of Forest Harvesting on Long-term Site Productivity* (eds W J Dyck, D W Cole, and N B Comerford) pp 13-40. Chapman and Hall, London.