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Palaeoecology By Palynology:
A Palaeoecological Study of the Vegetation of the
Tongariro Volcanic Centre, New Zealand,
Immediately Prior to the c. 232 AD Taupo Eruption.

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Natalie Jane Banks

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ABSTRACT.

The usual source of pollen for analysis has been from within deposits of peat from lakes, bogs and mires. Soils have not generally been considered a potentially useful pollen source. Under some circumstances, however, (such as volcanic eruptions) a soil may be buried so rapidly that the pollen it contains will be more or less completely preserved in the resulting palaeosol. Studies of such volcanically buried palaeosol pollen have been made overseas.

The last eruption from the Taupo Volcanic Centre occurred approximately 1800 years ago. The culminating phase of the eruption ejected ca 30 cubic kilometres of ignimbrite as a very hot and fluid pyroclastic flow which covered an area with a radius of 70-90 km centred on Lake Taupo. This deposit is known as the Taupo Tephra. The purpose of the present investigation was to examine peats and palaeosols directly beneath the Taupo Tephra from a variety of sites within the Tongariro area and to analyse any pollen preserved. Samples were taken from a total of 42 sites at various altitudes and distances from the eruptive source, and pollen extracted. Each sample taken, therefore, was from a buried soil or peat directly below the Taupo Tephra. The pollen contained within these samples and contains pollen deposited immediately prior to the eruption. An initial qualitative investigation indicated that the ignimbrite acts as an effective filter in preventing any contemporary pollen and spores from percolating through into underlying layers.

The preservation of pollen was reasonably good at most sites allowing some conclusions to be drawn as to the structure and composition of the pre-eruption forests of the Tongariro area. Beech forest was widespread throughout, especially at higher altitudes, although mixed conifer associations were also evident, particularly in the west.

At those sites where pollen preservation was poor, some alternative conclusions can be drawn about preservation environments within palaeosols. The pH value is particularly important, and pollen and spores are not well preserved when the soil pH value is in excess of 6.0. The possibility of differential preservation within the New Zealand flora is also examined.

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