The Flora of the Lost World Cavern, Mangapu Caves System, Waitomo, Te Kuiti

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ABSTRACT

The Lost World is a chasm that opens directly into the Mangapu Lost World Cave System. Located between Te Kuiti and Waitomo, near Troopers Road, the cave is of considerable interest because its flora exists under conditions of low light and relatively high humidity, about 60 metres below ground level.

The flora has received only cursory examination previously, the only account known to the authors being that of C. Smart (1978) in the Te Kauri Journal of the Hamilton Junior Naturalist Club (Inc.).

On July 27 1985, a party led by Mr Kevan Wilde of Waitomo visited the cave for several hours to further examine the flora.

The Environment

The Lost World is a deep chasm, some 100m long and c. 90m deep. It is probably a collapsed chamber, the debris of which has filled parts of the chamber to the height of 15m.

Vegetation in the cave 60 m below ground level receives its light from a long, narrow, steep-sided opening. Full lighting of the cave floor is never achieved.

Generally, by comparison with surface environments, temperature and humidity are relatively constant. However, cave entrances are transitional zones where outside conditions still modify the environment. In addition, air movement within the cave may be produced by changes in outside climatic conditions as well as other influences. The most important type of cave air movement is the so-called "chimney effect". This effect results from temperature differences between the inside and outside of a multiple entrance cave resulting in a "blowing" cave, and is readily felt during the descent at Spider Hole into the Lost World.

Furthermore, temperature inversions pond cold air in the cave, so fog is a feature of the cave atmosphere, saturating everything in a film of cold water.

Soil formation in the cavern is minimal. In places, the ground between the boulders is covered in a thick, waterlogged mor layer. Below this is a coloured A horizon (generally) of some 30-50 mm in depth, under which a massive, gritty, sandy-textured, calcareous C horizon overlies unconsolidated rock. This soil is completely saturated and consequently decomposition of the organic matter is slow.

The Cave Flora

The flora consists of the lower light tolerant species found in the bush surrounding the opening to the Lost World. Conditions in the cave do not favour the growth of most vascular species past the cotyledon stage of germination.

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The most abundant vascular plant is parataniwha (*Elatostema rugosum*) which, in places, produces stems up to 3 metres long - dimensions rarely reached under normal bush conditions.

Parataniwha is abundant in wet, waterlogged sites and on damp boulders, but is absent from the drier or less well lit parts of the cavern near the Spider Hole entrance.

Ferns are the next most abundant component of the vascular flora and are confined to places where the substrate is not too damp. The most abundant species are *Asplenium bulbiferum* subsp. *bulbiferum* and *Adiantum cunninghamii*. Both are widespread on substrates and walls of the cavern where conditions are less damp. *Pteris saxatilis* is found in similar sites.

Blechnum chambersii and *B. membranaceum* are locally abundant near the Spider Hole entrance into the cavern, but are soon replaced by the moss *Thamnobryum pandum* where the substrates become too damp.

It seems probable that it is moisture level, not light, that is the major controlling factor in the distribution of fern species. It was noticed that in very damp but well-lighted places ferns were absent or rare.

Other vascular plants are scarce. In the best lit and drier parts of the cavern, pate *(Schefflera digitata)*, hangehange *(Geniostoma rupestre)*, mahoe (*Melicytus ramiflorus* subsp. *ramiflorus*) and nikau (*Rhopalostylis sapida*) were found. All seem likely to survive, as all except the nikau were noted in 1978 by Smart.

Five small but healthy rangiora (*Brachyglottis repanda* var. *repanda*) were found in a crevice. These were also recorded by Smart (1978) and appear to have grown little since then. One specimen has produced several branches, one of which carried a floral bud. This is of interest as few Angiosperms have reached a reproductive state within the cavern.

Seedlings and plants of *Olearia rani, Litsea calicaris, Hedycarya arborea, Ripogonum scandens* and *Urtica incisa* were also noted, most of which seem unlikely to survive for long because of low light levels.

The most important plants are the Bryophytes. These dominate the cavern; they are the first plants encountered, and are present on all but the hardest of sites. The most important species appear to be *Thamnobryum pandum, Acrophyllum dentatum* and *Echinodium hispidum*, all of which are common around cave entrances in the region. Algae and fungi, although present in the cave, were not investigated. However, a brief search was made for lichens. The entire floor of the cavern is covered in material that has fallen in from the opening, amongst which are many species of lichen, few of which are likely to establish here. Only one, *Pseudocyphellaria rufovirescens* has actually colonised the cavern so far.

The Checklist

Smart (1978) lists 22 spp. of Tracheophytes and Cryptogamic plants, one of which was erroneously identified as *Adiantum aethiopicum* and four not seen in the investigation. The checklist presented here contains 51 spp., an increase of 70%. Most of these gains have been in the Bryophytes, an expected result as these are the more difficult parts of the flora to identify.

General

On the advice of local people the exact locality of the cave has not been given.

ACKNOWLEDGEMENTS

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REFERENCE

Smart, C. 1978. Flora of the Lost World. *Hamilton Junior Naturalist Club Journal*, Te Kauri.

APPENDIX

The Flora of the Lost World Cavern, Mangapu System, Southern Waitomo, Troopers Road (not including Mycophytes and Thallophytes).

† = Uncommon or Local (recorded for the vascular species and the lichen only, as inadequate time was available to award an abundance status to the Bryophytes).

(Smart 1978) Listed by Smart but not seen by P.J. de Lange or J.E. Stockley.

‡ = Not recorded by Smart (1978), (30 spp.). Vouchers cited have been lodged in the Waikato University Herbarium (WAIK).

FERNS

Adiantum cunninghamii [1]‡	4793
Anarthropteris lanceolata † ‡	4794
Asplenium bulbiferum ssp. *bulbiferum*	4789
A. flaccidum ssp. *flaccidum* † ‡	4790
A. oblongifolium † ‡	4797
Blechnum chambersii	4787
B. membranaceum	4788
Hymenophyllum dilatatum † ‡	4791
Pneumatopteris pennigera	4795
Polystichum richardii	4792
Pteris saxatilis	4796
Trichomanes endlicherianum † ‡	5071

DICOT TREES

Alectryon excelsus var. *excelsus* †‡	
Aristotelia serrata † ‡	4830
Hedycarya arborea † ‡	4846
Litsea calicaris † ‡	4847
Melicytus ramiflorus ssp. *ramiflorus* †	4800
Olearia rani † ‡	4829
Schefflera digitata †	4798

DICOT SHRUBS

Brachyglottis repanda var. *repanda* †	4828
Coprosma robusta[2] (Smart 1978)	
Geniostoma rupestre var.	4801

DICOT HERBS

Elatostema rugosum	4799
Urtica incisa † ‡	5070

MONOCOT TREES & LIANES

Rhopalostylis sapida † ‡
Ripogonum scandens † ‡

BRYOPHYTES

Mosses

Acrophyllum dentatum	4811
Camptochaete arbuscula‡	4809
Cyathophorum bulbosum	4803
Distichophyllum microcarpum‡	4807
Echinodium hispidum	4810
Fissidens leptocladus ‡	
Gymnostomum calcareum ‡	
Homalia falcifolia	
Hypnodendron arcuatum (Smart 1978)	
Hypopterygium filiculaeforme ‡	4802
Leucobryum candidum (Smart 1978)	
Lopidium concinnum (Smart 1978)	
Papillaria crocea ‡	4805
Pterygophyllum distichophylloides	4812
Rhacopilum convolutaceum‡	4804
Thamnobryum pandum	4808
Thuidium laeviusculum (Smart 1978)	
Weymouthia mollis ‡	

Liverworts

Aneura orbiculata ‡	4814
Chiloscyphus triacanthus ‡	4813
Frullaria nicholsonii‡	
Monoclea forsteri	4786
Radula buccinifera ‡	4806
Symphyogyna prolifera † ‡	4815
Thalloid species; yellowish, platy habit, unidentified (Skinner pers.comm.) ‡	

LICHEN

Pseudocyphellaria rufovirescens † ‡	4886

1. Smart recorded *Adiantum aethiopicum* as present in the cavern, but failed to find *A. cunninghamii* which is very abundant throughout the drier sections of the cave. An error in identification perhaps?

2. Smart notes "Only a few plants, all seedlings. Unlikely to survive." Our search did not locate this species.

Motuoroi, East Coast, North Island

by Geoff Walls,[1] Pam Bain,[2] and Lindsay Daniel [3]

SUMMARY

The vegetation of Motuoroi, an islet on the East Coast north of Gisborne, has been drastically modified in the past, and is now a mosaic of rapidly regenerating, native, coastal plant communities, with a clear effect of aspect on species composition. Introduced plants are rampant in places. Motuoroi probably once supported thriving breeding colonies of seabirds, but their numbers are now few, most likely because of the presence of rats and wekas.

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