

INDIGENOUS HIGHER PLANTS (PSILOPSIDS, LYCOPODS, FERNS,  
GYMNOSPERMS, FLOWERING PLANTS) OF MT RILEY\*,  
RICHMOND RANGE, MARLBOROUGH, 500-1314 M

\*Grid ref. NZMS 260 028 682771

A.P. Druce, Wellington, May 1990 (revised July 1991, Oct 1992)  
(Based on visit March 1989)

(unc) - uncommon

**GYMNOSPERM TREES AND SHRUBS**

*Dacrydium cupressinum*

*Libocedrus bidwillii*

*Podocarpus hallii*

*P. nivalis* (unc)

*Prumnopitys ferruginea*

*P. crassifolius*

*P. simplex* (incl. *P. s. var. sinclairii*)  
(unc)

*P. sp.* (unnamed; included in *P. colensoi*, as var. *ternatus* and as var. *fiordensis*, by Wardle 1968) (unc)

**MONOCOT TREES AND SHRUBS**

*Cordyline banksii*

*Waimannia racemosa* var.  
*racemosa*

**DICOT TREES**

*Carpodetus serratus*

*Elaeocarpus hookerianus* (unc)

*Griselinia littoralis*

*Metrosideros umbellata*

*Nothofagus fusca*

*N. menziesii*

*N. solandri*

*N. truncata*

*Oleaia rani* var. *colorata*

*Pseudopanax arboreus* var.  
*arboreus*

*P. colensoi* s.s. (unc)

**DICOT SHRUBS**

*Brachyglottis adamsii*

*Cassinia leptophylla* var. (*C. vauvilliersii*)

*Coprosma ciliata* ssp. *ciliata*

*C. colensoi* s.s.

*C. foetidissima*

*C. linariifolia*

*C. lucida* s.s.

*C. microcarpa*

*C. pseudocuneata* ssp.

*C. thamnoides*

(incl. *C. polymorpha*)

C.sp. (i) (unnamed; included in *C. parviflora* - *Pseudopanax anomalus* (unc) flora by Oliver, 1935, and others) (If *Pseudowintera axillaris* undersurface not minutely hairy as *P. colorata* is usual in *C. parviflora*; drupes vs. unpigmented, occ. purplish red)

### DICOT LIANES

C.sp. (ii) (unnamed) (*C. parviflora* var. *Metrosideros diffusa* (unc) *dumosa* sensu Allan 1961, non *C.p. M. perforata* (unc) var. *dumosa* Cheeseman)

*Cyathodes* sp. (*C. juniperina* agg.) (lvs vs.  $< 1\text{cm} \times < 1\text{mm}$ )

*Rubus cissoides* var. (leaflets broader than in var. *cissoides*) (unc)

*Dracophyllum longifolium* var.

*D. uniflorum*

*Gaultheria antipoda*

*G.* sp. (*G. depressa* agg.)

### PSILOPSIDS AND LYCOPODS

*Tmesipteris elongata* (incl. *T.e. ssp. robusta*)

*T. tannensis*

*Lycopodium fastigiatum*

*L. scariosum*

*L. varium* (incl. *L. billardierei* and *L. novae-zelandicum*)

*L. volubile*

*Hebe canterburciensis*

*H. vernicosa*

*Kunzea ericoides* agg.

*Leptospermum scoparium*

*Leucopogon fasciculatus* var.

*L. fraseri* s.s.

*Meliccytus alpinus* s.s. (unc)

*Myrsine divaricata* s.s.

*M. nummularia* (unc)

*Olearia arborescens* (Martin 1932)

*O. lacunosa* var. *lacunosa*

*Pentachondra pumila*

*Pimelea gnidia*

*P. longifolia* var. *longifolia*

*Pittosporum rigidum* var. (*P. crassicaule*)

### FERNS

*Asplenium flaccidum*

*A. hookerianum* (unc)

*A. richardii*

*Blechnum discolor*

*B. fluviatile* agg.

*B. pennina-inaurata*

*B. procerum*

*Cyathea colensoi*

*C. dealbata*

*C. smithii*

- Grammitis billardierei*
- G. givenii* (unc)
- G. magellanica* ssp. *nothofageti*
- G. poeppigiana* (unc)
- Histiopteris incisa*
- Hymenophyllum bivalve*
- H. demissum*
- H. flabellatum*
- H. malingii* (unc)
- H. multifidum*
- H. tarum*
- H. rufescens* (unc)
- H. villosum*
- Hypolepis millefolium*
- Paesia scaberula*
- Phymatosorus pustulatus*
- Polystichum vestitum*
- Pteridium esculentum*
- Pyrosia eleagnifolia*

**ORCHIDS**

- Chiloglottis cornuta* (unc)
- Corybas trilobus* s.s. (unc)
- Eatina autumnalis* (unc)
- E. mucronata* s.s. (unc)
- Thelymitra* sp.

**GRASSES**

- Agrostis* sp. (unnamed; aff. *A. dyeri*) (panicle spreading, not contracted as in *A. dyeri*)
- Chionochoa cheesemani*
- C. pallens* ssp. *pallens*

- Deyouxia aucklandica*
- D. avenoides* (incl. *D. a.* var. *brachyantha*)
- Poa breviglumis*
- P. colensoi*
- Rytidosperma gracile*
- R. setifolium*

**SEDGES**

- Carex acicularis* (unc)
- Gahnia pauciflora*
- Uncinia astonii* (unc)
- U. caespitosa*
- U. clavata* (unc)
- U. drucei* (unc)
- U. filiformis*
- U. involuta* (unc)
- U. rupestris* (incl. *U. angustifolia*)
- U. silvestris* (incl. *U. affinis*)
- U. sp.* (unnamed) (*U. affinis* sensu Hamlin 1959, non *U. hiparica* var. *affinis* Col. ex Clarke)

**RUSHES**

- Luzula* sp. (*L. picta* agg.)

**MONOCOT HERBS OTHER THAN ORCHIDS, GRASSES, SEDGES, RUSHES**

- Astelia* sp. (unnamed; aff. *A. nervosa*) (lvs broader than in *A. nervosa*, not conspicuously white adaxially as in *A. nervosa*)

Dianella nigra  
Luzuriaga parviflora  
Phormium cookianum

Ranunculus verticillatus  
Schizaelema roughii  
Stellaria decipiens (incl. S. parviflora)

Wahlenbergia albomarginata var. albomarginata (incl. W. pygmaea var. laxa, W. brockiei, and W. simpsonii)

COMPOSITE HERBS

Anaphalis sp. (Helichrysum bellid-ioides s.s.)  
Brachyglottis sp. (unnamed)  
Celmisia heteracifolia var. C. totlandii (Martin 1932)  
C. spectabilis ssp. spectabilis  
Gnaphalium aulax  
Helichrysum filicaule  
Raoulia glabra

No. of species: 150.

DICOT HERBS OTHER THAN

COMPOSITES

Acaena auctinifolia  
Aciphylla ferox  
A. polita var. polita  
Anisotome aromatica  
Epilobium atriplicifolium s.s. (unc)  
E. cockayneanum  
E. sp. (E. linnaeoides?) (unc)  
Euphrasia montoi  
Gentiana corymbifera  
Kelleria dielfenbachii  
Myosotis sp. (M. australis agg.)  
(fls very small, white) (unc)  
> Nerteta depressa (incl. N. cunningghamii)  
N. sp. (unnamed; aff. N. dichondrifolia) (hairs present on both surfaces of lf, straight, not hooked as in N. dichondrifolia)  
(unc)

REFERENCES

Hamlin, B.G. 1959: A revision of the genus Lucina. Dom Mus. Bull. 19. 186 pp.  
Martin, W. 1932: The vegetation of Marlborough. Reprinted from Marlborough Express.  
Moore, L.B. 1961: In "Flora of N.Z." Wellington. Government Printer, Vol. 1. 185 pp.  
Oliver, W.R.B. 1935: The genus Coprosma. Bishop Mus. Bull. 132. 207 pp.  
Wardle, P. 1968: N.Z. J. Bot. 6: 226-36.

M. sp. (b) (unnamed; included in M. pygmaea, as var. drucei, by Moore 1961) (unc).

THE UNIVERSITY OF CHICAGO

PHYSICS DEPARTMENT  
5720 S. UNIVERSITY AVE.  
CHICAGO, ILL. 60637

PHYSICS 435  
LECTURE 10

1. The first part of the lecture discusses the concept of a wave function and its relationship to probability. It is shown that the wave function  $\psi(x)$  is a complex-valued function of position  $x$ , and its squared magnitude  $|\psi(x)|^2$  represents the probability density of finding a particle at that position. The wave function must be normalized so that the total probability of finding the particle somewhere is equal to one.

2. The second part of the lecture discusses the Schrödinger equation, which is a partial differential equation that governs the time evolution of the wave function. It is shown that the stationary states of a system are given by the solutions to the time-independent Schrödinger equation, and that the energy eigenvalues are determined by the boundary conditions of the system.

3. The third part of the lecture discusses the concept of expectation values, which are the average values of physical quantities over many measurements. It is shown that the expectation value of an operator  $\hat{O}$  is given by the integral of the wave function multiplied by the operator, and that the expectation value of the energy is given by the integral of the wave function multiplied by the Hamiltonian operator.

4. The fourth part of the lecture discusses the concept of uncertainty, which is a fundamental property of quantum mechanics. It is shown that the uncertainty in the position of a particle is related to the uncertainty in its momentum, and that the uncertainty in the energy of a system is related to the uncertainty in its time.

5. The fifth part of the lecture discusses the concept of tunneling, which is a quantum mechanical phenomenon in which a particle can pass through a potential barrier that it classically would not be able to pass through. It is shown that the probability of tunneling is given by the exponential of the negative of the barrier height, and that tunneling is a key feature of many quantum devices.