

30.1.51

"THE PLANT ECOLOGY OF PART OF THE MT. LOFTY RANGES"

AND

"A RECONNAISSANCE SURVEY OF THE SOILS AND VEGETATION
OF THE HUNDREDS OF TATIARA, WIRREGA AND STIRLING OF
COUNTY BUCKINGHAM."

Thesis submitted for the degree of Master of Science.

by

R.L. Specht.

1949

THE PLANT ECOLOGY OF PART OF THE MOUNT LOFTY RANGES (1)

By R. L. SPECHT and R. A. PERRY *

[Read 10 June 1948]

CONTENTS

1. INTRODUCTION	92
2. TOPOGRAPHY	92
3. GEOLOGY	94
4. CLIMATE	95
5. SOILS	97
(1) Lateritic podsols	99
(2) Podsols	101
(3) Grey-brown podsols	102
(4) Calcimorphic soils	103
(5) Red-brown earths	105
(6) Ferrimorphic soils	105
(7) Deep sands with neutral reaction	105
(8) Miscellaneous soils	105
6. VEGETATION	107
A. Environmental Range of—	
(1a) <i>E. odorata</i>	108
(1b) <i>E. odorata</i> "Whipstick Mallee" type	109
(2) <i>E. leucoxylo</i> n	109
(3) <i>E. viminalis</i>	110
(4) <i>E. camaldulensis</i> (syn <i>E. rostrata</i>)	111
(5) <i>E. obliqua</i>	111
(6) <i>E. Baxteri</i>	112
(7) <i>E. fasciculosa</i>	112
(8) <i>E. cosmophylla</i>	113
(9) <i>E. rubida</i>	113
(10) <i>E. elaeophora</i>	114
(11) <i>Casuarina stricta</i>	114
(12) Hybrids	114
(13) Formations	114
B. Classification of the Plant Communities	116
(1) <i>E. odorata</i> association	116
(2) <i>E. leucoxylo</i> n — <i>E. viminalis</i> association	116
(3) <i>E. camaldulensis</i> association	117
(4) <i>Casuarina stricta</i> association	117
(5) "Stringybark" edaphic complex	117
<i>E. obliqua</i> association	
<i>E. obliqua</i> — <i>E. Baxteri</i> association	
<i>E. Baxteri</i> — <i>E. cosmophylla</i> association	
<i>E. fasciculosa</i> association	
<i>E. rubida</i> association	
(6) Ecotones	119
(g) Miscellaneous communities	120
7. SUMMARY	122
8. ACKNOWLEDGMENTS	122
9. REFERENCES	122
10. APPENDICES	
(1) Mechanical and chemical analyses of soils	124
(2) Comparative floristic lists of five major vegetational groups	127

* Department of Botany, University of Adelaide.

INTRODUCTION

This paper deals with the ecology of that part of the Mount Lofty Ranges between the Torrens Gorge in the north and Noarlunga in the south.

The area surveyed by Specht lies between the Torrens Gorge in the north, grid line 80 of the Adelaide and Echunga ordnance map in the east and grid line 68 in the south, while Perry surveyed the area from grid line 68 in the north to 52 in the south extending east from the coast to grid line 68.

The only previous ecological work on this area was a reconnaissance survey by Adamson and Osborn (1). As can be expected from reconnaissance survey, some generalisations were made which probably apply to part of the Mount Lofty Ranges but not necessarily to the whole. Adamson and Osborn did not publish any vegetation map, nor did they indicate in the text the exact localities studied. Since then detailed work on the soils of the southern portion of the Hundred of Kuitpo, by Taylor and O'Donnell (21) and on the geology by Sprigg (17, 18, 19) form a useful background to this study of ecology.

Considering the limited size but complexity of the area, it was deemed necessary that the ecology should be approached from a study of the autecology of the dominant tree species and of the formations. With this in view the distribution of the tree species and formations was mapped by projecting their limits on a contour map. As many factors as possible of the environment were examined and attempts were made to correlate the distribution of the species with the environment. The soils were surveyed by borings at each grid intersection on the ordnance survey maps, i.e. at approximately 1,000 yard intervals.

Because of the complexity of the environment the study of the vegetation could be regarded as a number of specially designed experiments in which possibly only one factor at a time was variable. For instance, it was found that soils of different nutrient status occurred contiguously under the same climatic conditions, while soils of one group extended from regions of low to high rainfall. Of course, any generalisation can only be accepted on the understanding that it may not necessarily apply to other areas of the Mount Lofty Range. However, although other surveys of the ecology of this State have been of rather a broad nature in comparison, they have yielded conclusions roughly similar to some suggested in this survey. These have been indicated in their appropriate places within the text. It must be pointed out that in dealing with the trees whose roots tend to penetrate to great depth, the early stages of growth are considered crucial in their development within the environment in which they are found.

As most of the soils throughout the area are extremely poor most of the area has been left relatively undeveloped. It is only along the coastal parts in the south, the Adelaide Plains and fertile valleys and ridges of the Hills, that much agricultural development has taken place. Most of the soils of the coastal area are planted with vineyards and orchards, but some cereals are grown. The Adelaide Plain, although now closely settled, was once an extensive cereal growing area, while the small fertile portions of the hills are planted with orchards, vegetables and some pastures. The savannah woodlands are used in their natural state for grazing.

A RECONNAISSANCE SURVEY OF THE SOILS AND VEGETATION
OF THE HUNDREDS OF TATIARA, WIRREGA AND STIRLING OF
COUNTY BUCKINGHAM.

by
R.L. Specht.

I.

CONTENTS

1. Introduction	3
2. Locality	3
3. Climate	5
4. Geology	8
5. Pedology	9
A. Grey soils of heavy texture	12
B. Red brown earths	15
C. Complex of grey and red soils of heavy texture	16
D. Solodized woodland soils	18
E. Rendzinas	20
F. Red mallee soils	20
G. Meadow podsols	22
H. Stirling sandy clay loam	22
I. Laffer sand - woodland phase	22
6. The Vegetation	27
A. Autecology of the dominant species	27
(1) <u>Casuarina luehmanni</u>	27
(2) <u>E. calcicultrix</u>	28
(3) <u>E. leucoxyton</u>	29
(4) <u>E. largiflorens</u>	30
(5) <u>E. camaldulensis</u>	31
(6) <u>Melaleuca pubescens</u>	31
(7) <u>E. fasciculosa</u>	35
(8) Savannah woodland formation	35
B. Classification of the plant communities	35
(1) <u>Casuarina luehmanni</u> association	36
(2) <u>E. calcicultrix</u> association	39
(3) <u>E. leucoxyton</u> association	44
(4) <u>E. camaldulensis</u> association	49
(5) <u>E. largiflorens</u> association	49
(6) <u>Melaleuca pubescens</u> association	49
(7) "Desert" edaphic complex	51
(a) <u>E. baxteri</u> association	
(b) <u>E. fasciculosa</u> - <u>Xanthorrhoea semiplana</u> association.	

2.

Contents continued.

(c) <u>E. incrassata</u> - <u>E. leptophylla</u> - <u>Melaleuca uncinata</u> association	
(d) <u>E. behriana</u> - <u>E. anceps</u> association	
(e) <u>Xanthorrhoea semiplana</u> - <u>Banksia ornata</u> association	
(f) <u>E. incrassata</u> - heath association	
(g) <u>E. diversifolia</u> association	
(8) <u>E. leucoxyton</u> - <u>E. fasciculosa</u> ecotone	59
7. Summary	62
8. Acknowledgements	62
9. References	63
10. Appendix - A comparative floristic list of the major vegetation communities.	64

Reconnaissance Survey of the Soils and Vegetation of the
Hundreds of Tatiara, Wirrega and Stirling of County Buckingham.

by R.L. Specht.

INTRODUCTION

This reconnaissance survey of the soils and vegetation of portion of the Upper South East of South Australia is intended as a basis for a pasture survey being carried out by the Waite Agricultural Research Institute, and financed by the Australian Wool Board.

This survey is primarily concerned, ^{with} the woodland communities of the Keith (Hundred of Stirling) and Tatiara ^{districts} (Hundreds of Wirrega and Tatiara) in the Upper South East of South Australia. These fertile communities lie within the mallee-broombush, heath and mallee-heath communities of the "Deserts" and show a sharp line of demarcation from them. The possible relationships between the woodland communities and those of the "Deserts" have been investigated

The survey has been made by examining the distribution of the soils and vegetation along all the passable surveyed roads of the area. Extrapolation of the boundaries was found unnecessary in most cases, for the roads were relatively close together. However, as most of the surveyed roads of the "Deserts" were impassable, the vegetation there has been correlated and mapped from aerial photographs.