A STUDY OF THE PRIMARY VASCULAR SYSTEM AND EVOLUTION IN THE FAMILY CUPRESSACEAE

by

Anne Pillman, B.Sc. (Hons.)

Thesis submitted for the degree of Master of Science,

University of Adelaide

May, 1978

TABLE OF CONTENTS

TABLE OF CONTENTS (cont.)

TABLE OF CONTENTS (cont.)

LIST OF ILLUSTRATIONS

LIST OF TABLES

SUMMARY

The architecture of the primary vascular system has been investigated in 26 species from 14 genera of the family Cupressaceae, and five patterns, referred to as (a), (b), (c), (d) and (e), have been described. Of these (a), (b) and (d) have been described previously for the Cupressaceae (Namboodiri and Beck, 1968), but (c) and (e) are described for the first time. Type (e) represents a possible evolutionary step between two previously known patterns, (a) and (d). Pattern (d) occurs widely in the subfamily Cupressoideae but is absent from all but one species of the subfamily Callitroideae, thus providing further evidence in support of the theory of long independent evolution of the two subfamilies. Pattern (c) is confined to *Callitris* and *Actinostrobus*, indicating a probable close relationship between these two genera. Investigation of the other two members of the tribe Callitreae could help clarify the composition of this tribe. The other three patterns are distributed widely among the genera of Cupressaceae and thus in general the architecture of the primary vascular system is not a useful generic character in this family. Other studies on the evolution of the Cupressaceae have been reviewed, so that the evolution of vascular patterns could be considered in conjunction with other evidence to provide a more complete picture of evolution within the family.

DECLARATION

This thesis contains no material which has been accepted for the award of any other degree or diploma and, to the best of my knowledge, contains no material previously published or written by any other person, except where due reference is made in the text.

Anne Pillman

ACKNOWLEDGEMENTS

I wish to thank the following people who have assisted with this study: Dr. D.C. Christophel for suggesting the topic and his assistance as my supervisor, Dr. J. Jessop and Dr. E.M. Wollaston, my co-supervisors during Dr. Christophel's absence in the latter half of 1977, for their encouragement and helpful criticism of the manuscript, Mr. B. Rowlands for technical assistance with the preparation of serial sections and Mr. D. Blackburn for help with photography.