

THESES, SIS/LIBRARY  
R.G. MENZIES BUILDING NO.2  
Australian National University  
Canberra ACT 0200 Australia

Telephone: +61 2 6125 4631  
Facsimile: +61 2 6125 4063  
Email: [library.theses@anu.edu.au](mailto:library.theses@anu.edu.au)

## USE OF THESES

**This copy is supplied for purposes  
of private study and research only.  
Passages from the thesis may not be  
copied or closely paraphrased without the  
written consent of the author.**

THE  
REGENERATION OF  
Eucalyptus pauciflora Sieb. ex Spreng.  
FROM SEED

by

Douglas Graham Abrecht

A thesis submitted for the degree  
of Doctor of Philosophy of the  
Australian National University

February 1985



## BIBLIOGRAPHY

- Alvey N.G., Galwey N. & Lane P. (1982) An Introduction to Genstat. Academic Press.
- Alvey N.G., Galwey N. & Lane P. (1980) Genstat 4.03. A General Statistical Program. Lawes Agricultural Trust.
- Ashton D.H. (1981) In: Fire and the Australian Biota (eds A.M. Gill, R.H. Groves and I.R. Noble). Australian Academy of Science.
- Ashton D.H. (1979) Seed harvesting by ants in forests of Eucalyptus regnans F. Muell. in central Victoria. Aust. J. Ecol. 4, 265-277.
- Ashton D.H. & Willis E.J. (1982) Antagonism in the regeneration of Eucalyptus regnans in the mature forest. In: The Plant Community as a Working Mechanism (ed E.I. Newman). Special Publications Series of the British Ecological Society Number 1.
- Bachelard E.P. (1967a) Effects of gibberelic acid, kinetin and light on the germination of dormant seeds of some Eucalypt spp. Aust. J. Bot. 15, 393-401.
- Bachelard E.P. (1967b) Role of seed coat in dormancy of E. pauciflora and E. delegatensis seeds. Aust. J. Biol. Sci. 20, 1237-1249.
- Bartlett M.S. (1937) Some examples of statistical methods of research in agriculture and applied biology. J. Roy Stat. Soc. (Suppl) Series B 4(2), 137-170.
- Bartlett N.R. (1978) A survival model for a wood preservative trial. Biometrics 34, 673-679.

- Beardsell D., Mullett J. (1984) Seed germination of Eucalyptus pauciflora Sieb. ex Spreng. from low and high altitude populations in Victoria. Aust. J. Bot. 32, 475-480
- Bewley J.D. & Black M. (1978) Physiology and Biochemistry of Seeds in Relation to Germination. Springer-Verlag Berlin. Vol. 1: Development, germination and growth.
- Bewley J.D. & Black M. (197?) Physiology and Biochemistry of Seeds in Relation to Germination. Springer-Verlag Berlin. Vol. 2: Viability, dormancy, environmental control.
- Black J.N. (1956) Influence of seed size and depth of sowing on preemergence and early vegetative growth of subterranean clover. Aust. J. Agric. Res. 7, 98-110.
- Boden R.W. (1957) Some aspects of seed dormancy in Eucalypts. Aust. For. 21, 81-85.
- Boland D.J., Brooker M.I.H., Turnbull J.W. & Kleinig D.A. (1980) Eucalyptus seed. CSIRO Australia.
- Boland D.J., Brooker M.I.H., Chippendale G.M., Hall N., Hyland B.P.M., Johnston R.D., Kleinig D.A., Turner J.D. (1984) Forest Trees of Australia. CSIRO Australia.
- Bonner F.T. & Dell T.R. (1976) The Weibull function: a new method of comparing seed vigor. J. Seed Tech. 1, 96-103.
- Chippendale G.M. (1976) Eucalyptus nomenclature. Aust. For. Res. 7, 69-107.
- Christensen P.S. (1971) Stimulation of seedfall in Karri. Aust. For. 35, 182-190.
- Clifford H.T. (1953) A note on the germination of Eucalyptus seed. Aust. For. 17, 17-20.
- Costin A.B. (1954) A Study of the Ecosystems of the Monaro Region of NSW. Govt. Printer NSW.

- Cox D.R. (1972) Regression models and life tables. J. Roy. Stat. Soc. B34, 198-220.
- Cremer K.W. (1965a) How eucalypt fruits release their seed. Aust. J. Bot. 13, 11-16.
- Cremer K.W. (1965b) Effects of fire on seedshed from *E. regnans*. Aust. For. 29, 252-262.
- Cremer K.W., Cromer R.N. & Florence R.G. (1978) In: Eucalypts for Wood Production (eds. W.E. Hillis and A.G. Brown). CSIRO Aust.
- Cunningham R.B., Axelsen, A. & Morley F.H.W. (1981) The analysis of conception times in beef heifers. Aust. J. Agric. Res. 32, 669-679.
- Cunningham T.M. (1960) The natural regeneration of *Eucalyptus regnans*. Bull. No. 1 School of Forestry, University of Melbourne.
- Davidson H.J. & Reid J.B. (1980) Comparison of early growth characteristics of the *Eucalyptus* subgenera Monocalyptus and Symphomyrtus. Aust. J. Bot. 28, 453-461.
- Dobson A.J. (1983) An Introduction to Statistical Modelling. Chapman & Hall.
- Dowling P.M., Clements R.J. & McWilliam J.R. (1971) Establishment and survival of pasture species from seeds grown on the soil surface. Aust. J. Agric. Res. 22, 61-74.
- Gauga E. & Pryor L.D. (1958) Seed coat anatomy and taxonomy in *Eucalyptus* I. Proc. Linn. Soc. NSW 88, 20-32.
- Goodchild N.A. & Walker M.G. (1971) A method of measuring seed germination in physiological studies. Ann. Bot. 35, 615-621.
- Gordon A.G. (1971) The germination resistance test - a new test for measuring germination quality of cereals. Can. J. Pl. Sci. 51, 181-183.

- Green J.W. (1967) A study of altitudinal variation in *Eucalyptus pauciflora* Sieb. ex Sprengel. Ph.D. Thesis Australian National University.
- Green J.W. (1969a) Taxonomic problems associated with continuous variation in *Eucalyptus pauciflora* Sieb. ex Spreng. Taxon. 18, 269-276.
- Green J.W. (1969b) Temperature responses in altitudinal populations of *E. pauciflora* Sieb. ex Spreng. New Phytologist 68, 399-410.
- Grose R.J. (1957) Notes on dormancy and effects of stratification on germination of some Eucalypt seeds. Bull. For. Commiss. Victoria No. 3.
- Grose R.J. (1960) The Silviculture of *E. delegatensis*. Ph.D. Thesis University of Melbourne.
- Grose R.J. (1962) Germination Responses of Seeds of Victorian Eucalypts. Vic. For. Comm. Tech. Pap. 16, also Paper in Section K, ANZAAS, Sydney 1962.
- Grose R.J. (1963) The silviculture of *E. delegatensis*. Part 1. Germination and seed dormancy. Bull. School of Forestry, University of Melbourne No.2.
- Grose R.J. & Zimmer W.J. (1957) Preliminary laboratory studies on light requirements for the germination of some Eucalypt seeds. Aust. For. 21, 76-80.
- Grose R.J. & Zimmer W.J. (1958a) The collection and testing of seed from some Victorian Eucalypts with results of viability tests. Bull. For. Comm. Victoria No. 10.
- Grose R.J. & Zimmer W.J. (1958b) A description of the seeds of 70 Victorian Eucalypts. Bull. For Comm. Victoria No. 8.

- Grose R.J. & Zimmer W.J. (1958c) Influence of seed size on germination and early growth of seedlings of *Eucalyptus maculata* Hook. f. and *Eucalyptus sieberiana* F.v.M. Bull. For. Comm. Victoria No. 9.
- Grose R.J. & Zimmer W.J. (1958d) Some laboratory germination responses of the seeds of River Red Gum, *Eucalyptus camaldulensis* Dehn. Aust. J. Bot. 6(2), 129-153.
- Grubb P.J. (1977) The maintenance of species richness in plant communities: the importance of the regeneration niche. Biol. Rev. 52, 107-145.
- Harper J.L. (1959) The ecological significance of dormancy. Proc. IV. Int. Congr. Crop. Prod. (Hamburg 1957) pp. 415-420.
- Harper J.L. (1977) The Population Biology of Plants. Academic Press, London, New York, San Francisco.
- Harper J.L. (1982) In: The plant community as a working mechanism. Special Publication of British Ecology Soc. No. 1 (ed E.I. Newman). Blackwell Scientific Publication.
- Harwood C.E. (1976) Ecological Studies of Timberline Phenomena. Ph.D. Thesis Australian National University.
- Heydecker W. (1966) Clarity in recording germination data. Nature 210, 753-754.
- Heydecker W. (1972) Seed Ecology (ed. Heydecker W.) Proc. 19th Easter School in Agricultural Science. University of Nottingham. Butterworths, London.
- Hillis W.E. & Brown A.G. (1978) Eucalypts for Wood Production (ed. Hillis W.E. and Brown A.G.). CSIRO, Australia.
- Howard T. & Ashton D.H. (1967) Studies of soil seed in Snowgum woodland. Vic. Nat. 84, 331-335.

- Hunter E.A. Glaseby C.A. & Naylor R.E.L. (1984) The analysis of data from germination tests. J. Agric. Sci. Camb. 102, 207-313.
- Jacobs M.R. (1955) Growth Habits of the Eucalypts Commonwealth of Australia Forestry and Timber Bureau, Canberra.
- Janssen J.G.M. (1973) A method of Recording Germination Curves. Ann. Bot. 37, 705-708.
- Karssen C.M. (1981) Environmental conditions and endogenous mechanisms involved in secondary dormancy of seeds. Israel J. Bot. 29, 45-54.
- Kaufmann M.R. (1969) Effects of constant water potential on germination of lettuce, sunflower and citrus seeds. Can. J. Bot. 47, 1761-1764.
- Kotowski F. (1926) Temperature relations to germination of vegetable seed. Proc. Am. Soc. Hort. Sci. 23, 176-184.
- Ladiges P.Y. (1974) Differentiation in some populations of *Eucalyptus viminalis* Labill. in relation to factors affecting seedling establishment. Aust. J. Bot. 22, 471-486.
- Levins R. (1969) Dormancy as an adaptive strategy. Sym Soc. Exp. Biol. 23, 2-20.
- Maiden J.H. (1922) A Critical Revision of the Genus Eucalyptus Vol. 6 p 10. Govt. Printer, Sydney.
- McCullagh P. & Nelder J.A. (1983) Generalized Linear Models. Chapman & Hall, London New York.
- McWilliam J.R. & Phillips P.J. (1971) Effect of osmotic and matrix potentials on the availability of water for seed germination. Aust. J. Biol. Sci. 24, 423-431.
- Nag (1983) Fortran Manual Mark 10 Vol. 2, Numerical Algorithms Group. Oxford UK.

- Naylor R.E.L. (1981) An evaluation of various germination indices for predicting differences in seed vigor in Italian ryegrass. Seed Sci. & Technol. 9, 593-600.
- Nelder J.A. & Wedderburn R.W. (1972) Generalized linear models. J. Roy. Stat. Soc. (A) 135,(3), 370.
- Nichols M.A. & Heydecker W. (1968) Two approaches to the study of germination data. Proc. Int. Seed Test. Ass. 33, 531-540.
- Noble I.R. (1980) Interactions between tussock grass (Poa spp.) and Eucalyptus pauciflora seedlings near treeline in South-eastern Australia. Oecologia 45, 350-353
- Noble I.R. (1984) Mortality of lignotuberous seedlings of Eucalyptus species after an intense fire in montane forest. Aust. J. Ecol. 9, 47-50
- Nobs M.A. & Hagar W.G. (1974) Analysis of germination and flowering rates of dimorphic seeds from Atriplex hortensis. Ann. Report Carnegie Inst., Dept. Plant Biology.
- O'Dowd D.J. & Gill A.M. (1980) Induction of massive, synchronized seed fall in Eucalyptus delegatensis by fire. Aust. Seed Sci. Newsl. 6, 21-23.
- Phillips M.A. & Brown A.H. (1972) Mating system and hybridity in E. pauciflora. Aust. J. Biol. Sci. 30, 337-344.
- Pryor L.D. (1954) Improved germination of some alpine Eucalypts by stratification. Aust. For. 18, 104-106.
- Pryor L.D. (1957) Variation in Snowgum (Eucalyptus pauciflora Sieb.). Proc. Linn. Soc. NSW 81, 299-300.
- Pryor L.D. (1963) Ash-bed growth response as a key to plantation establishment on poor sites. Aust. For. 27, 48-51
- Pryor L.D. & Johnson L.A.S (1971) A Classification of the Eucalypts, Australian National University, Canberra.

- Renbuss M.A., Chilvers G.A., Pryor L.D. (1972) Microbiology of an ash-bed. Proc. Linn. Soc. NSW 97, 302-310
- Richter R.D. & Switzer G.L. (1982) A technique for determining quantitative expressions of dormancy in seeds. Ann. Bot. 50, 459-463.
- Schimpf D.J., Flint S.D. & Palmbald I.G. (1977) Representation of germination curves with the logistic function. Ann. Bot. 41, 1357-1360.
- Scott L. (1972) Viability testing of Eucalypt seed. Forestry and Timber Bureau Leaflet No. 116.
- Scurfield G. (1961) The effects of temperature and day length on species of Eucalyptus. Aust. J. Bot. 9, 37-56.
- Slatyer R.O., Morrow P.A. (1977) Altitudinal variation in the photosynthetic characteristics of Snowgum, Eucalyptus pauciflora Sieb. ex Spreng. I. Seasonal changes under field conditions in the Snowy Mountains area of south-eastern Aust. J. Bot. 25, 1-30
- Slatyer R.O. (1977) Altitudinal variation in the photosynthetic characteristics of Snowgum, Eucalyptus pauciflora Sieb. ex Spreng. III. Temperature Response of Material Grown in Contrasting Thermal Environments. Aust. J. Plant Physiol. 4, 301-312.
- Slatyer R.O. (1978) Altitudinal variation in the photosynthetic characteristics of Snowgum, Eucalyptus pauciflora Sieb. ex Spreng. VII. Relationship between gradients of field temperature and photosynthetic temperature optima in the Snowy Mountains area. Aust. J. Bot. 26, 111-121.
- Slatyer R.O., Cochrane, P.M. & Galloway, R.W. (1985) Duration and extent of snow cover in the Snowy mountains and a comparison with Switzerland. Search 15, 11-12

- Sokal R.R. & Rohlf F.J. (1969) Biometry. the principles and practice of statistics in biological research. W.H. Freeman and Company.
- Stokes P. (1965) Temperature and seed dormancy. Encyclopaedia of Plant Physiology 15(2), 746-803. Ruhland W. ed. Springer, Berlin.
- Thompson P.A. (1970) Characterisation of the germination responses to temperature of species and ecotypes. Nature Lond. 225, 827-831.
- Thompson K. & Grime J.P. (1983) A comparative study of germination responses to diurnally fluctuating temperatures. J. Appl. Ecol. 20, 141-156.
- Timson J. (1965) New method of recording germination data. Nature 207, 216-217.
- Tranquillini W. (1979) Physiological Ecology of the Alpine Timberline, Ecological Studies 31. Springer-Verlag.
- Vegis A. (1964) Dormancy in higher plants. Ann. Rev. Pl. Physiol. 15, 185-224.
- Weiss P.W. (1983) Invasion of coastal Acacia communities by Chrysanthemoides. Ph.D Thesis, Australian National University.
- Wimbush D.J & Costin A.B. (1979) Trends in vegetation at Kosciusko. II. Sub-alpine range transects 1959-1978. Aust. J. Bot. 27, 789-831.
- Wardle P. (1981) Is alpine timberline set by physiological tolerance, reproductive capacity, or biological interactions. Proc. Ecol. Soc. Aust. 11, 53-66.
- Wellington A.B. (1981) A Study of the Population Dynamics of the Mallee Eucalyptus incrassata Labill. Ph.D. Thesis, Australian National University.

Wellington A.B. (1984) Leaf water potentials, fire and the regeneration of mallee eucalypts in Australia. Oecologia 64, 360-362.

Wellington A.B. & Noble I.R. (1985) Seed dynamics and factors limiting recruitment of the mallee Eucalyptus incrassata in semi-arid South-eastern Australia. J. Ecol. 73 (in press)