



STUDIES ON WEED RISK ASSESSMENT

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January 1999

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ABSTRACT

The weed risk assessment system (WRA) recently implemented in Australia as part of modifications to its quarantine risk assessment procedures is claimed to be a highly accurate predictor of weeds. Such predictive accuracy is at odds with current ecological theory and with predictive accuracy in other fields such as chronic health risk assessments.

This thesis gives an overview of factors used in weed risk assessments and explores the disparity between the measured high accuracy rate of the WRA and the fairly pessimistic assessments of some workers about the possibility of predicting the weed potential of plant species imported in the future. The accuracy of the WRA may not be as high as previously thought, and it varies with weed definition and with taxonomic groups. The WRA is not a reliable predictor of weeds when it is considered in the context of the base-rate probability of an introduced plant becoming weedy in Australia. As a result a far greater number of non-weeds will be placed on the prohibited imports list than was initially expected.

Cluster analysis and comparative analysis by independent contrasts were employed to determine the value of individual biological and ecological questions on the WRA questionnaire. Results showed that some WRA questions could be deleted from the questionnaire and the scores for others could be weighted differently. I also argue that the 'evaluate further' outcome should be discarded, reducing the possible outcomes of potential importation application assessments to two: 'accept' or 'reject'.

I discuss the management implications of the above findings, including the use of a modified WRA as part of a process to assign priorities to naturalised species for control. I explore the lack of sensitivity of the WRA in detecting environmental weeds and the implications of permitting further imports of naturalised species on the grounds that they are already present in Australia.

Future research should focus on using importation records to calculate the base-rate probability of newly introduced exotic species becoming weedy in Australia; establishing whether there are good predictors of weediness for weeds of conservation areas and for plants in the Rosidae, especially the Fabaceae; and elucidating the factors involved in the transition from establishment to naturalisation and from naturalisation to invasion in Australian ecosystems.

ACKNOWLEDGEMENTS

I have had excellent supervision from Dr. Jim Fortune and Dr. Mark Lonsdale throughout the period of my candidature. Dr Jim Fortune has consistently provided me with good, clear and gentle guidance despite the geographical distance between us. Dr Mark Lonsdale, gave me excellent intellectual training and guidance. Mark is my husband as well as my supervisor and I thank him for his support and patience at home while I worked on my project.

The research component of this thesis was conducted at the CSIRO European Laboratory near Montpellier in France from 1996-1998. I thank all the staff and students there at that time for making me welcome. In particular, Christophe Espiau whose proficient management of the laboratory's computer system ensured that I always had the computing and communication facilities necessary to complete my project. Christine Silvy, the librarian for the INRA group at the CSIRO laboratory, also assisted me by conducting bibliographic database searches and by arranging loans of books and articles on my behalf.

Rod Randall and Dr Paul Pheloung provided me with a copy of the WRA spreadsheet and test data set used throughout this thesis. Dr. Mark Rees taught me when and how to use CAIC software, and gave me a copy of his CAIC phylogeny files for seed plants. This saved me hours of work, and provided me with a good framework for the phylogeny I eventually used to test the WRA data set.

I could not have written this thesis without the help of kind-hearted folk who looked after my dear daughter, Camilla Lonsdale, while I worked. Florence, Didier, Helene and Sebastian Grosclaude and my parents, Bill and Thea Smith, did this for me. Bill and Thea also lent me their computer after mine was stolen, and Thea helped me proof read the thesis.

I thank the Cooperative Research Centre for Weed Management Systems for partly funding this study.

CANDIDATE'S STATEMENT

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

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