

Control Manual
Weeds of National Significance

Lantana

Current management and control options for
lantana (*Lantana camara*) in Australia



Natural Heritage Trust
Helping Communities Helping Australia



Natural Resources, Mines and Energy
Queensland Government



NSW Agriculture

Lantana control manual

Current management and control options
for lantana (*Lantana camara*) in Australia

Weeds of National Significance

May 2004

This manual has been produced by the National Heritage Trust,
the Department of Natural Resources, Mines and Energy, Queensland,
and New South Wales Department of Agriculture.



This publication is intended to provide information only on the subject under review. It is not intended to, nor does it constitute, expert advice. Readers are warned against relying solely on the information contained herein. Further professional advice should be sought before acting on the information supplied in this manual.

While all care has been taken in the preparation of this document, neither the Department of Natural Resources, Mines and Energy, nor its officers or staff accept any responsibility for any loss or damage that may result from any inaccuracy or omission in the information contained herein.

©The State of Queensland (Department of Natural Resources, Mines and Energy) 2004
Copyright protects this publication. Except for purposes permitted by the *Copyright Act 1968* (Qld), reproduction by any means (photocopying, electronic, mechanical, recording or otherwise) is prohibited without the prior written permission of the Department of Natural Resources, Mines and Energy.

Copyright enquiries should be addressed to:
The Director of Product Marketing
Department of Natural Resources, Mines and Energy
GPO Box 2454
Brisbane Qld 4001
QNRM04015
ISBN 1 920920 07 2
#16977

Editing, design, proofreading and production:
Web and Publishing Services, Department of Natural Resources, Mines and Energy

Photography:
Trevor Armstrong, Faiz Bebawi, Andrew Clark, Mike Day, Kirk Gilmour, Hellen Haapakoski, Ken Harley, Martin Hanaan-Jones, Graham Harding, Robin Hill, Helen Irwin, Rosemary Joseph, Stephanie Lymburner, Don Lynch, Euan McLean, Alison Newman, Elissa van Oosterhout, Mick Richards, Colin Wilson, Jeff Wright.

Illustrations, maps and diagrams:
Grant Flockhart, Ben Lawson, Paul Lennon

This manual is part of the Lantana Weeds of National Significance (WONS) Program managed by Andrew Clark, National Lantana Coordinator, Department of Natural Resources, Mines and Energy.

For copies of this manual, contact:
Product distribution warehouse
Ph: (07) 3896 3224

Web site: www.nrm.qld.gov.au/pests/wons/lantana

Front cover: Springbrook National Park Queensland (Mick Richards); Pink-edged red lantana (Jeff Wright)
Back cover: Infestation at Cangai, NSW (Mike Day); Pink lantana (Jeff Wright)

Acknowledgments

Principal author and compiler

Elissa van Oosterhout, Lantana Project Officer, Department of Natural Resources, Mines and Energy (NRM&E), Qld.

Key participants

Andrew Clark, National Lantana Coordinator, NRM&E, Qld

Mike Day, Entomologist, Alan Fletcher Research Station, NRM&E, Qld

Emily Menzies, Technical Officer, Tropical Weeds Research Centre, NRM&E, Qld

The development of this manual would not have been possible without the valuable contributions of many technical reviewers, landholders and land managers.

Technical reviewers

Trevor Armstrong, Alan Fletcher Research Station, NRM&E, Qld

Paul Back, Department of Primary Industries and Fisheries (DPI&F), Qld

Harry Bishop, DPI&F, Qld

Paul Brennan, State Forests of NSW

Angus Carnegie, State Forests of NSW

Chris Delamont, Energex

Ann Doak, NRM&E, Qld

Michael Dodkin, New South Wales National Parks and Wildlife Service,
Department of Environment and Conservation, (NSW NPWS)

Paul Downey, NSW NPWS

Graeme Elphinstone, DPI&F, Qld

Liz Gardiner, NRM&E, Qld

Hellen Haapakoski, NRM&E, Qld

Martin Hannan-Jones, Alan Fletcher Research Station, NRM&E, Qld

Graham Harding, Eurobodalla Shire Council

Royce Holtkamp, NSW Agriculture

David Jinks, Springbrook Catchment Management Landcare Group Incorporated

Denise Johnson, NRM&E, Qld

Peter Jones, NRM&E, Qld

Rosemary Joseph, NSW NPWS

Peter Langford, Queensland Rail

Victor Little, NRM&E, Qld

Ross McKenzie, DPI&F, Qld

Munro Mortimer, Environmental Protection Agency (EPA), Qld

Paul O'Hare, DPI&F, Qld

Colin O'Keefe, Queensland Parks and Wildlife Service (QPWS), Qld

John Peeters, Ergon Energy

Peter Rigden, DPI&F, Qld

Norman Scott, Department of Main Roads (DMR), Qld

Jack Simpson, State Forests of NSW

John Thorp, National Weeds Management Facilitator

Allan Tomley, Alan Fletcher Research Station, NRM&E, Qld

Joe Vitelli, Tropical Weeds Research Centre, NRM&E, Qld

Lyn Willsher, NRM&E, Qld

Gary Zerner, NRM&E, Qld.

Information was provided by:

Zarni Bear, student, Griffith University (GU)
Richard Denham, Department of Infrastructure, Planning and Natural Resources, NSW
Chris Love, Dow AgroSciences
Don Lynch, Army Promotion Training Centre, Kokoda Barracks, Canungra
Bruce Noble, Brisbane Forest Park, EPA, Qld
Daniel Stock, PhD student, GU
Barry Whyte, NRM&E, Qld.

National lantana survey

A national lantana survey was completed by 1021 landholders and land managers, providing valuable insight into current field practice in the management and control of lantana in Australia. The surveys were distributed by dedicated staff of local government authorities, community groups and state agencies. Thanks to all participants.

National Lantana Management Group

Thanks to members of the National Lantana Management Group who provided valuable comment and peer review:

Ken Bubb, DPI&F Forestry, Qld
Ray Byrnes, Eacham Shire Council
Margo Canavan, community representative, Qld
Mike Day, Alan Fletcher Research Station, NRM&E, Qld
Wendy Drake, EPA, Qld
Rod Ensbey, NSW Agriculture
Sylvia Graham, community representative, NSW
Andrew Leys, NSW NPWS
Stephanie Lymburner, community representative, NSW
Phil Maher, NRM&E, Qld
John Morris, community representative, Qld
Ian Turnbull, Bellingen Shire Council.



National Lantana Management Group members
(L-R): E. van Oosterhout, A. Leys, I. Turnbull, R. Ensbey,
W. Drake, A. Clark, S. Lymburner, M. Day, J. Thorp
(National Weeds Management Facilitator), S. Graham,
R. Byrnes, K. Bubb, E. Menzies
Absent: M. Canavan, P. Maher, J. Morris

Highly appreciated in-kind support was received from the following organisations:

Alan Fletcher Research Station, NRM&E, Qld
Army Promotion Training Centre (APTC), Kokoda Barracks, Canungra
NSW NPWS
Department of Infrastructure, Planning and Environment, Northern Territory
DPI&F Forestry, Qld
Eacham Shire Council
Eurobodalla Shire Council
Land for Wildlife program, EPA, Qld
Malanda and Upper Johnstone Catchment Group
NSW Agriculture
North Coast Weeds Advisory Committee
South East Queensland Pest Advisory Forum
Southern Tablelands and South Coast Weeds Advisory Committee

Foreword

Lantana camara has been a weed in Australia for 160 years, and has unfortunately become a part of the landscape in much of eastern Australia. It has been recognised as a Weed of National Significance because of the major threat it poses to primary production, biodiversity, ecotourism, and recreation in some of the richest regions of Australia. The lantana problem is complex, and could become more so with further hybridisation of weedy and ornamental varieties.

A concerted effort is required for the control of this major weed. A re-evaluation of attitudes to lantana, integration of control methods, nationally coordinated management, and continued diligence are necessary to prevent worsening of the lantana problem and potential future spread.

This manual is the first to assemble current knowledge and practice from the range of landholders and communities affected by lantana. By encouraging an integrated approach to control and highlighting needs for further information, it will assist in attaining best practice management.

I commend all those involved in the production of this manual for their valuable input.



Bruce Wilson
Director
Land Protection
Department of Natural Resources, Mines and Energy

Using the manual

Where does the information come from?

The information in this manual is compiled from a survey of field practices, reviews by technical experts and previously published information. Comments by landholders about their experiences with managing lantana are included throughout. The final section, 'Further information' contains results from the national lantana survey and other reference material including the quick reference table for lantana control methods—a summarised guide to the range of available control methods.

As the strategies for lantana control described here have not been trialled in all relevant land-use situations, this manual cannot be considered the final word in best practice. Many opportunities exist for further research in the pursuit of best practice knowledge.

The manual is designed to meet the needs of many readers by providing information that is most relevant to a variety of land-use situations.

'The lantana profile' gives information about the weed itself, its physical characteristics and its distribution. Reference and other factual material is provided in the final section, 'Further information'. The main body of the manual is divided into three sections:

Section 1: Managing lantana in different situations

Use this section to decide which lantana control methods are appropriate for your land-use situation.

Section 1 describes how lantana affects different land-use situations (for example, pastures and natural ecosystems), and which control methods are feasible, suitable and acceptable in each case. The choice of methods to control lantana should be closely aligned with the present or desired use of the site or property.

Section 2: Control methods

Refer to this section for instructions on how to carry out a particular method.

Section 2 describes each control method in detail. These have different effects, and can be used at different stages of control and in different combinations to meet many goals.

'we hand weed in areas where lantana is intertwined with good shrubs and trees, we spray herbicide in areas where there is only lantana, and we use a bobcat on the flat areas.' (Landholder, Brookfield, Qld)

'we hand pull when soil moisture is high, use a mattock when soil moisture is lower or the plants are large, do basal bark spraying in rocky outcrop areas, spray foliage in areas the dozer can't get to without damaging trees, and bulldoze in low, open areas with dense infestations.' (Landholder, Giru, Qld)

Section 3: Planning a control strategy

Use this section to develop a strategy based on prioritising and goal setting, which moves through the stages of treatment, follow-up, revegetation and monitoring.

Section 3 explains the importance of planning, realistic goal setting, and staged and integrated control, giving examples and tips to help you develop an effective strategy for your situation.

Contents

Acknowledgments	iii
Foreword	v
Using the manual	vi

The lantana profile **1**

Lantana: a Weed of National Significance	2
Description	5
Reproduction and spread	8
Distribution: current and potential infestations	10
Effects of climate	12
Regrowth and re-infestation	14

Section 1: Managing lantana in different situations **15**

Lantana control—the golden rules	16
Pastures and grazing lands	17
Natural ecosystems	20
Watercourses	24
Steep and inaccessible areas	25
Orchards and crops	26
Commercial forestry	27
Disused or vacant land	29
Utility easements, roadways and railways	30
Gardens and landscaping	31

Section 2: Control methods **33**

Manual control methods	34
Chemical control methods	36
Mechanical control methods	42
Control by trampling and grazing	44
Biological control	45
Control by fire	48
Follow-up, monitoring and revegetation	51

Section 3: Planning a control strategy **53**

Step-by-step planning	54
-----------------------	----

Further information **57**

Legal and safety requirements	58
From the survey	59
Declarations in each state and territory	61
For more information	63
Appendix 1: Table of active constituents registered for use on lantana	64
Appendix 2: Lantana biocontrol information sheets	67
Appendix 3: Quick reference table for lantana control methods	84
References	86