Suitable Species for the Reclamation and Sustainability of Saline Land in Southern Australia

Mary-Jane E. Rogers
Cooperative Research Centre for Future Farming Industries, Australia

A. D. Craig
Cooperative Research Centre for Future Farming Industries, Australia

T. D. Colmer
Cooperative Research Centre for Future Farming Industries, Australia

R. Munns
Cooperative Research Centre for Future Farming Industries, Australia

S. J. Hughes
Cooperative Research Centre for Future Farming Industries, Australia

See next page for additional authors

The 21st International Grassland Congress / 8th International Rangeland Congress took place in Hohhot, China from June 29 through July 5, 2008.

Proceedings edited by Organizing Committee of 2008 IGC/IRC Conference

Published by Guangdong People's Publishing House

Presenter Information

Mary-Jane E. Rogers, A. D. Craig, T. D. Colmer, R. Munns, S. J. Hughes, P. G. H. Nichols, and D. Henry

Suitable species for the reclamation and sustainability of saline land in southern Australia

M . E . Rogers , A . D . Craig , T . D . Colmer , R . Munns , S . J . Hughes , P . G . H . Nichols and D . Henry
Cooperative Research Centre for Future Farming Industries , Perth , Western Australia 6009 , Australia . E-mail : Mary Jane . Rogers@ dpi .vic .gov .au

Key words : genetic diversity , plant salt tolerance , soil salinity

Introduction Dryland and irrigation induced-salinity remain serious environmental problems in many parts of the world and may worsen in scale due to the effects of climate change . In Australia , it is believed that around 5 .7 million hectares of agricultural land are currently affected by dryland salinity—the majority of which is in Western Australia . In addition , due to a prolonged period of drought and water shortage , there are now large areas of land in south eastern Australia that can no longer be irrigated and which are potentially saline . Selecting suitable grassland species to regenerate and rehabilitate saline land throughout southern Australia is a research priority to ensure that production and sustainability is maintained .

Materials and methods This collaborative project , which involved four states and territories in Australia , commenced in 2004 . Priority plant genera that showed good potential for salt and waterlogging tolerance were identified in the literature and using practical knowledge (Rogers et al . , 2005) . These species were evaluated for salt and waterlogging tolerances under glasshouse conditions before promising species entered into a field assessment .

Results and discussion Suitable plant species that performed well included both introduced species and native Australian species (Table 1) . Ideally , species most suited to reclaiming saline land are those that combine good relative salt and waterlogging tolerance with vigorous growth under non-stressed conditions—however not many of the species evaluated fell into this category . Consequently listed species range from productive , annual species (e .g . *Melilotus indicus*) suitable for grazing , to slower-growing perennial species (e .g . *Sporobolus virginicus*) that propagate vegetatively and are effective at colonising and stabilising saline salt scalds . For some species (e .g . *Melilotus siculus*) , further research is required to identify suitable matching rhizobia before this species can reach its maximum potential in saline areas (Rogers et al . , 2007) . Further research is also required in some annual species (e .g . *Medicago polymorpha*) to select for salt tolerance at germination (Nichols et al . , 2007) . It is important that all selected species are evaluated for their weed risk before being introduced into saline areas .

Table 1 *Some identified legumes , grasses and herbs with salt and waterlogging tolerance .*

Plant Category	Species
Legumes	*Lotus glaber Medicago polymorpha , Medicago sativa , Melilotus indicus , Melilotus siculus (syn . messanensis) , Melilotus sulcatus ssp . segetalis , Trifolium hybridum , Trifolium argutum , Trifolium ornithopodiodes*
Grasses	*Aeluropus lagopoides , Austrodanthonia carphoides , Austrodanthonia linkii , Austrodanthonia setacea , Austrostipa bigeniculata , Distichlis distichophylla , Poa sallacustris , Puccinellia ciliata , Puccinellia distans , Sporobolus mitchellii , Sporobolus virginicus*
Herbs	*Lawrencia spicata , Plantago coronopus .*

References

Nichols , P . G . H . Craig , A . D . , Rogers , M . E . , Albertsen , T . O . , Miller S . M . , McClements , D . R . , Hughes , S . J . , D'Antuono M . F , Dear , B . S . 2007 . Production and persistence of annual pasture legumes at five saline sites in southern Australia . *Australian Journal of Experimental Agriculture* (in press) .

Rogers , M . E . Colmer T . D . , Frost , K . , Henry D . , Cornwall , D . , Hulm , E . , Deretic , J . , Hughes , S . J . , Craig , A . D . 2007 . Diversity in the genus Melilotus for tolerance to salinity and waterlogging . *Plant and Soil* (in press) .

Rogers , M . E . , Craig , A . D . , Munns R . , Colmer T . D . , Nichols , P . G . H . , Malcolm , C . V . , Barrett-Lennard , E . G . , Brown , A . J . , Semple , W . S . , Evans , P . M . , Cowley , K . , Hughes , S . J . Snowball , R . Bennett , S . J . , Sweeney , G . C . , Dear , B . S . and Ewing , M . 2005 . The potential for developing fodder plants for the salt-affected areas of southern and eastern Australia : An overview . *Australian Journal of Experimental Agriculture* 45 (4) 301-329 .