Selecting Grassland Species for Saline Environments

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The XX International Grassland Congress took place in Ireland and the UK in June-July 2005. The main congress took place in Dublin from 26 June to 1 July and was followed by post congress satellite workshops in Aberystwyth, Belfast, Cork, Glasgow and Oxford. The meeting was hosted by the Irish Grassland Association and the British Grassland Society.

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Introduction In Australia, around 5.7 million hectares of agricultural land are currently affected by dryland salinity or at risk from shallow water tables and this figure is expected to increase over the next 50 years (LWRA, 2001). Most improved grassland species cannot tolerate the combined effects of salt and waterlogging and, therefore, the productivity of sown grasslands in salt-affected areas is low. However, there is potential to overcome the lack of suitably adapted fodder species by introducing new, salt and waterlogging-tolerant species and by diversifying the gene pool of proven species. Potential species include exotic, naturalised and native Australian grass, legumes, herb and shrub species that are halophytes and non-halophytes. A collaborative national project in southern Australia commenced in 2004 with the objective of evaluating a range of forage species for saline environments.

Materials and methods The project involves glasshouse and field research. Forage germplasm is being acquired from Australian and International Genetic Resource Centres and by direct collection from centres of natural diversity for salt and waterlogging tolerance. Plant material will be evaluated for salt and waterlogging tolerance under glasshouse conditions before promising species are assessed in the field and validation phases undertaken in saline environments. It is envisaged that some priority plant material will be available and recommended to primary producers by year 6 of the project.

Results and discussion Table 1 lists the priority plant genera that have been identified with potential for salt and waterlogging tolerance and that will be evaluated in this research project (Rogers *et al*., 2004). Initially, priority will be given to the development of superior legume cultivars, since generally these are less tolerant than their companion grasses, yet are considered "drivers" of the system, being the providers of nitrogen and forage of high nutritive value. Within this project, species will be ranked according to forage nutritive value, biomass, ground cover potential, seasonality, ease of establishment, seeding potential, persistence (eg. perenniality, palatability, drought tolerance, crown exposure etc) and for their potential weediness. Species will also be recognised for their role in areas where there is lateral and/or mosaic variation in the salt/waterlogging profile, and where a mixture of species with a range of salt tolerance levels may give the most productive option.

Table 1 High priority legumes, grasses, herbs and shrubs with salt or waterlogging tolerance

Plant category	Genera
Legumes	*Astragalus, Ceratoides, Glycyrrhiza, Hedysarum, Lotus, Medicago, Melilotus, Swainsona, Trifolium, Trigonella, Viminaria*
Grasses	*Aeluropus, Chloris, Cynodon, Dactyloctenium, Distichlis, Enteropogon, Eragrostis, Festuca, Lachnogrostis, Leptochloa, Paspalum, Pennisetum, Porteresia, Puccinellia, Saccharum, Sporobolus, Stenotaphrum, Thinopyrum, Zoysia,*
Herbs	*Cichorium, Plantago, Ptilotus*
Shrubs	*Acanthus, Atriplex, Chenopodium, Maireana, Minuria, Rhagodia*

Conclusion Finding new forage species that are adapted to saline and periodically waterlogged land will provide new options to manage dryland salinity within Australia and internationally.

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