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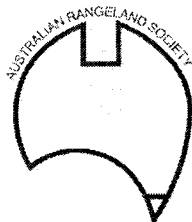
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NATIONAL ATRIPLEX NUMMULARIA GERMPLASM COLLECTION AND EVALUATION

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ABSTRACT

A national germplasm collection and evaluation of two of the three recognised subspecies of *Atriplex nummularia* (Oldman Saltbush) i.e ssp. *nummularia* and ssp. *spathulata* is being undertaken.

Seed and plant specimens have been collected from populations of *A. nummularia* ssp. *nummularia* and *spathulata* from across their geographical range.

Herbarium voucher specimens from each location and fresh leaf specimens for DNA analysis have been collected and will be examined as part of a taxonomic review.

Depending on the results of subspecies and provenance trials it is proposed that a plant improvement program be undertaken to produce one or more fully commercial cultivars.

INTRODUCTION

Figures released by the National Land and Water Resources Audit 2001 suggest that approximately 5.7 million hectares of agricultural land are currently affected or are at risk from dryland salinity with this area expected to increase.

FloraSearch as part of sub-program 3 of the Salinity CRC for Plant-based Management of Dryland Salinity is investigating potential woody fodder plant species which can be used to remove water from recharge areas or grow in highly saline landscapes. The majority of pasture cultivars currently available do not tolerate the combined effects of salt and waterlogging. *A. nummularia*, a halophyte, has been listed as having the desirable attributes of being able to survive in saline conditions and has efficient water use (able to utilise ground water), feed value and relatively high quality biomass production.

A. nummularia spp. naturally occur in the arid and semi-arid rangelands of Australia, where they have long been considered by graziers as an important fodder plant (Beadle 1948). Their distribution ranges from predominantly summer rainfall incidence in the north of their range to winter incidence in the south and on a variety of soil types from mainly clays to sand. *A. nummularia* subspecies particularly ssp. *nummularia* have also been used for decades in soil conservation programs mainly south of the Tropic of Capricorn, in southern Australian cropping systems and in other countries such as Morocco, Chilli, and South Africa as stock fodder.

While, commercial cultivars of Oldman Saltbush are available e.g. De Kock and Eyres Green Giant with some improvement in growth form, palatability and nutritional value there is still scope for greater improvement using a larger genetic base. There has not been a systematic attempt at plant improvement with this species in Australia despite its widespread adoption as a grazing species. As Oldman Saltbush is an outbreeding species producing considerable genetic variation (Rogers et al, 2005, Loch et al, 2003), there is immense potential using

genetic material from across its geographical distribution to select for improved traits such as forage value and palatability, increased biomass production, ease of establishment, salt tolerance and lower salt content leading to much wider cultivation of this species than currently exists.

OBJECTIVES

- Establish a national germplasm collection for two of the three subspecies of *A. nummularia* from across its natural range.
- Acquire new knowledge about the taxonomy of *A. nummularia* ssp.
- Develop one or more fully commercial cultivars of *A. nummularia* for low to medium rainfall agricultural areas of southern Australia to a) assist in controlling recharge associated with dryland salinity, b) improve salt tolerance and c) provide a robust palatable high protein perennial shrub for incorporation into southern cropping systems.

METHODOLOGY

Seed from twenty individuals of eleven provenances of *A. nummularia* ssp. *spathulata* and eighteen of *A. nummularia* ssp. *nummularia* have been collected. Every attempt has been made to sample populations from different soil types in areas of similar rainfall pattern and to sample individuals from across the distribution of a population to capture most of the gene pool.

For every provenance, information was recorded on soil type, landform and vegetation with each individual being tagged and photographed and data recorded on grazing impact, size, growth form and their location recorded using GPS.

A sample of seed from each individual has been stored at the Genetic Resource Centre in Adelaide with the remainder being propagated by a commercial nursery in WA. Plant voucher specimens from each provenance have been lodged with the South Australian State Herbarium and leaf DNA samples are being analysed for genetic variability.

Subspecies and provenance trials will be undertaken in three states (NSW, SA & WA) to evaluate the saltbush for desirable characteristics such as nutritional value, chemical composition, palatability, growth form and salt tolerance.

PARTICIPATING ORGANISATIONS

This is a Salinity CRC and Joint Agroforestry funded project in partnership with NSW DPI, Dept of Conservation and Land Management WA, SA Dept of Water, Land and Biodiversity Conservation, South Australian Research and Development Corporation and Vic DPI.

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