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Theme 4. Biodiversity, conservation and genetic improvement of range and forage species

Sub-theme 4.1. Plant genetic resources and crop improvement

The Australian Pastures Genebank

Steve Hughes

SARDI, Adelaide, Australia

Corresponding author e-mail: steve.hughes@sa.gov.au

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Introduction

Australian grazing enterprises, including all food and fibre productions, as well as crop rotation, are worth \$42 billion per annum to the Australian economy, employing around 693,000 Australian workers. Australia has been a major beneficiary from the introduction and utilization of genetic resources in pasture and forages. Assured access to plant genetic diversity underpins Australia's ability to maintain agricultural productivity in the face of environmental and economic challenges.

Australia is custodian of potentially the world's largest and globally significant collection of pasture and forage genetic resources. Much of this is unique and held in state-based collections and represents an invaluable resource for plant research and improvement in Australia and internationally. These collections were built up progressively over the past 70 years and were at risk due to a reduction in funding from host agencies and industry groups and were becoming increasingly inaccessible to potential clients. Australia required a national approach to genetic resources of pastures and forages to benefit industry and the environment and to support the International Treaty on Plant Genetic Resources for Food and Agriculture (Treaty).

Progress towards a national solution for pastures and forage genetic resources had been slow and difficult. In June 2014 an agreement was reached between relevant national Rural Research and Development Corporations and the Australian and State governments, for the establishment, funding and operation of the Australian Pastures Genebank (APG); Australia's first national pasture and forage genetic resource centre.

Objectives

The APG will strategically acquire, document, conserve, maintain and make available plant genetic diversity of pasture and forage species of actual or potential value to Australian agriculture. This includes plants to be grown for livestock, crop rotation and the environment.

The APG will be the hub for pasture and forage plant genetic resource activities in Australia providing for the needs of national and international users of pasture and forage genetic resources. This will involve information systems development, especially capturing and building on the knowledge base of priority species and by developing and nurturing close relationships nationally and internationally to acquire, multiply, conserve, document and distribute seed of priority species. In so doing it will underpin the ongoing development of plants for agriculture and the environment in Australia whilst also providing a source of genetic diversity for overseas programs.

The APG will provide plant genetic diversity in the form of seeds of phenotyped plants and ultimately, as more accessions are described at the molecular level, genes for particular traits.

The APG as custodian of the national collection will not claim legal ownership over the mandated germplasm, nor seek any intellectual property rights over germplasm or related information.

Vision

Conserve the diversity of Australia's current and prospective pasture and forage species for use nationally and internationally as the basis for enhanced agricultural productivity and environmental preservation now and in the future.

National mandate

All pasture and forage species of actual or potential value to Australian agriculture. This includes plants to be grown for livestock consumption, crop rotation and the environment.

The APG is led by the South Australian Research and Development Institute (SARDI) and is based at the SARDI Plant Research Centre at the Waite Campus in Adelaide, South Australia.

Through a transitional process, seed and associated data of over 70,000 accessions of temperate and tropical pasture and forage genetic resources from significant Commonwealth Scientific and Industrial Research Organization and State government collections will be transferred to the APG for long term conservation, maintenance and utilization. Data will be consolidated into one central database accessible online through GRIN-Global.

Regeneration of material will be undertaken in environment specific locations that best match species climatic and edaphic requirements. Seed regeneration will be undertaken at regional hubs in Queensland, South Australia, Tasmania and Western Australia.

The APG will operate under the framework of the Treaty in accordance with the provisions of Treaty's Multilateral System of Access and Benefit Sharing (multilateral system). Accordingly, pasture and forage accessions in the APG will in general be distributed under a Standard Material Transfer Agreement.

Conclusion

The establishment of the APG has been the result of over 30 years of reviews and recommendations. The centres fruition must also be attributed to the support of champions. Many passionate individuals recognized and advocated the role plant germplasm has in underpinning our agricultural systems providing both an immediate and a longer term strategic resource base for plant improvement (Auricht *et al.*, 2009).

The establishment of the APG has provided an opportunity for Australia to meet its obligations under the Treaty and support the conservation and management of Australia's pastures and forage genetic resources to the FAO Genebank Standards for Plant Genetic Resources for Food and Agriculture for the benefit of Australian Industry and national and global food security.

References

Auricht G. C., G. Grimes, S. J. Hughes, R. Redden, and R. Snowball. 2009. 'Australian Plant Genetic Resources Activities between 2004 and 2008', In: *Proc. 14th Australasian Plant Breeding Conference* (Cairns Australia: August 2009).

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The APG also acknowledges the contribution of the many countries from which the germplasm originated. The efforts of officials and farmers in these countries have enabled the material to become available either through direct collection or through exchange.