

FINAL REPORT

DAN00125

Australian Winter Cereals Collection

PROJECT DETAILS

PROJECT CODE: DAN00125

PROJECT TITLE: AUSTRALIAN WINTER CEREALS COLLECTION

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SUPERVISOR: GREG GRIMES (CURATOR)

ORGANISATION: NSW DEPARTMENT OF PRIMARY INDUSTRIES

CONTACT NAME: GREG GRIMES

Summary

The future of Australian agriculture relies very heavily on continued access to new sources of germplasm imported from other countries to enable plant breeders to breed or select new improved varieties. Australia's long term food security is hence dependent on secure access to plant germplasm. National approval was given for the establishment of the Australian Grains Genebank (AGG) at the Department of Primary Industries (DPI), Horsham in 2013. The AGG will store long term, regenerate and distribute GRDC mandated field crops with current collections being relocated from Biloela and Tamworth. Tropical germplasm will be increased in Queensland (QLD). GRIN-Global software will enable 'on line' requesting.

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The information contained in these older reports is now several years old, and may have been wholly or partially superseded or built upon in subsequent work funded by GRDC or others. Readers should be aware that more recent research may be more useful for their needs. Findings related to agricultural chemical use are also potentially out of date and are not to be taken as a recommendation for their use.

Conclusions

The following outcomes have been achieved:

- An agreed organisational structure for AGG for conservation of genetic resources of GRDC mandated field grain crops.
- An agreed budget for transition to the AGG.
- Adoption of GRIN-Global software for inventory, conservation, regeneration and distribution management of AGG germplasm.
- Node of AGG at Biloela for seed increase and regeneration of tropical crops germplasm
- Importation, curation, seed increase and regeneration and distribution of germplasm.
- Initial planning and arrangements made for transfer of germplasm collections.

Recommendations

The transition of germplasm and information to be undertaken in such a manner which does not interrupt the supply of germplasm to researchers.

Review of future quarantine facilities available for tropical crops and winter cereals with respect to the closure of Eagle Farm that reduced space at the Australian Winter Cereals Collection (AWCC) (2,600 to 600 pot capacity - June 2013). This will greatly reduce the amount of germplasm which can be introduced and increase the time taken to process.

The construction of the AGG facility is paramount in allowing the transfer of germplasm and information. The AGG cannot become fully functional until the infrastructure is complete.

Continuation of external collaborative projects for the AGG such as the Focused Identification of Germplasm Strategy (FIGS) project. Any project which 'value adds' to the germplasm should be encouraged. Continued close links with pre-breeders and breeders.

Milestones to be added to all GRDC projects (using germplasm) to state the following; Germplasm to be sourced via the AGG (if available), germplasm used in project to be offered to AGG for long term storage with any restrictions noted, information linked to germplasm be supplied to AGG.

Continued introduction of landrace and wild relatives for pre-breeding.

Continued development of GRIN-Global to allow links to other databases. This would include the use of the Genesys portal.

Collaborative project for the build up of selected barley and wheat mapping populations for accessioning and long term storage at the AGG.

Outcomes

The sustainability of Australian agriculture is dependent on continued access to new sources of germplasm to enable plant breeders to breed or select new, improved varieties of crops and forages. No country is self sufficient with respect to plant germplasm needed by plant breeding programs. The recently agreed International Treaty on Plant Genetic Resources for Food and Agriculture will enable researchers to gain access to germplasm collections in many other countries.

This project for winter cereals genetic resources will (1) acquire new germplasm of priority accessions from overseas, (2) ensure long term conservation of germplasm accessions with critical genetic diversity of exceptional value and (3) enhance use of the germplasm collections by research clients.

The transition towards the AGG has enabled the following procedures to be undertaken:

Standardisation of storage conditions - all seed will be stored long term at -18°C.

Centralised database (GRIN-Global) which enables 'on-line' searching and requesting, allowing greater access to germplasm for researchers - domestic and international.

Ability to satisfy Australia's responsibilities under the Treaty by the use of material transfer agreements (MTAs).

One point of contact in Australia for international organisations.

Achievements/Benefits

AWCC

The major achievements of the project are most easily measured in terms of transactions of seed coming into and being distributed by the AWCC. In 2011/12, 15,159 seed samples were distributed to both domestic and international researchers with the emphasis on ancestral and landrace types. The seed distributed to international clients has remained at a similar level to 2010 - an increase over previous years. This is partly due to the exposure the AWCC has had from collaborative international projects. The resources have also been fully used to identify sources of boron tolerance, salt tolerance in durum and new sources of resistance in Russian wheat aphid, powdery mildew and stem rust. New FIGS sets include heat tolerance, drought tolerance, Rubisco, salinity and frost tolerance in wheat and powdery mildew, frost and Russian wheat aphid in barley. Crown rot FIGS sets in bread wheat and durum are planned.

Australian Grains Genebank (AGG)

The transition towards the establishment of the AGG has been achieved.

The national agreement and funding for an AGG at Horsham for all GRDC mandated field crops collections was achieved, leading to a ministerial launch of AGG on 11 April 2012. A steering committee was formed to plan and oversee the seamless transition of germplasm and information to the AGG.

Specifications for the AGG building were developed by the curators of the current genebanks at Biloela, Tamworth and Horsham.

GRIN-Global (GG) was chosen to be the new database to enable 'on line' searching and requesting. This will increase use of the germplasm in long term storage by Australian and international researchers. Protocols for implementing this database in Australia have been largely completed, with the goal of loading all the passport data by March 2013.

Other research

The continued use of FIGS for the identification of germplasm in response to researchers' needs for wheat, oats and barley.

GRIN-Global to be used as a vehicle to allow data to be available in Genesys. (<http://www.genesys-pgr.org/>)

Intellectual property summary

Use of the standard material transfer agreement (SMTA) or other designated restrictions with all germplasm distribution.