PLANT SYNBIO AUSTRALIA

TRANSFORMING AGRICULTURE AND BIOMANUFACTURING THROUGH PLANT SYNTHETIC BIOLOGY

Plant transformation

at Plant SynBio Australia

The team at Plant SynBio Australia have developed extensive hands-on expertise in manipulating plant genetics to engineer improved genetic traits, with a particular focus on important agricultural cropping species.

Our transformation processes encompass the production of donor plants, Agrobacterium-mediated delivery of expression cassettes or CRISPR/Cas genome editing constructs into immature embryos, and then tissue culture based plant regeneration to obtain stable genetically modified plants.

plantsynbio.au

Plant SynBio Australia is funded through Bioplatforms Australia under the National Collaborative Research Infrastructure Strategy (NCRIS) and institutional partners

NCRIS National Research Infrastructure for Australia An Australian Government Initiative

BIOPLATFORMS AUSTRALIA

Adelaide University

Government of South Australia

Plant transformation

End-to-end transformation capability

Standard Agrobacterium-mediated transformation workflows have been established at Plant SynBio Australia (Plant SynBio) for two major cereal crops, barley (*Hordeum vulgare*) and wheat (*Triticum aestivum*).

The barley cultivar Golden Promise and the wheat cultivar Fielder are both routinely employed as model genotypes due to their relatively high amenability to genetic transformation and in vitro regeneration. However, our transformation services are not limited to model cultivars and can be adapted for a range of commercial genotypes upon request.

Plant SynBio also routinely transforms rice and canola. Our staff can perform each step of the entire transformation process from the preparation of starting material to the growth of transgenic plants for seed production.

Transformation and validation

The transformation process encompasses the production of donor plants, Agrobacterium-mediated delivery of expression cassettes or CRISPR/Cas genome editing constructs into immature embryos, and then tissue culture based plant regeneration to obtain stable, genetically modified plants.

Downstream molecular analyses include nucleic acid extraction, PCR-based screening, and sequence verification to confirm the presence and integrity of the introduced editing components, as well as to identify targeted genome modifications.

Together, these workflows enable the generation and validation of genetically modified plant lines for functional genomics and trait development studies.

Research connections

Plant SynBio is part of Bioplatforms Australia, a national infrastructure network providing research facilities and expertise to support life science research tackling national challenges in health, agriculture, food, and biodiversity. This allows us to support an integrated approach to research projects spanning genomics, proteomics, metabolomics and bioinformatics projects.

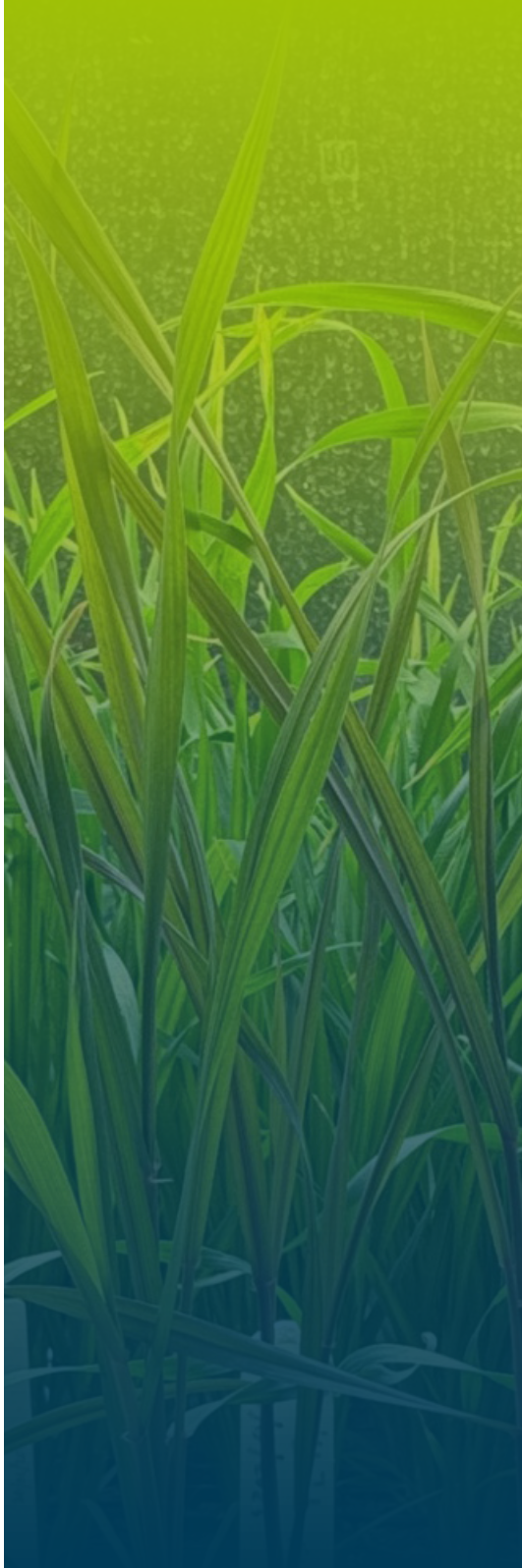
As part of Australia's National Collaborative Research Infrastructure Strategy (NCRIS) we are connected with over $4 billion worth of state-of-the-art infrastructure, data and expertise to help address complex research challenges. These connections include the Australian Plant Phenomics Network (APPN), the South Australian Genomics Centre (SAGC), the Australian Genome Research Facility (AGRF), Metabolomics Australia and Microscopy Australia.

Availability

Plant transformation services are available through Plant SynBio Nodes at Adelaide University, ANU Canberra, La Trobe University Melbourne, and the University of Western Australia Perth.

Capabilities:

- **Expertise in both transient and stable plant transformation** across a wide range of crops and horticultural species (e.g. wheat, barley, rice, canola, poplar, and almond).
- **Highly efficient transformation systems** tailored to multiple cultivars, including elite commercial varieties.
- **Fully equipped molecular biology laboratory:**
  - NanoCellect WolfG2 cell sorter
  - RNA/DNA handling and analysis equipment
  - qPCR capabilities
  - Analytical microscopes
  - Secure sample storage facilities
  - Plant tissue culture facility
  - Vacuum and biolistic transformation equipment



plantsynbio.au

Email us:
Adelaide University:
psba@adelaide.edu.au