



Welcome to our first Australian Native Rice Newsletter.

We anticipate producing a newsletter two to three times a year to communicate recent research on the commercialisation of Australian native rice. If you have questions, or wish to unsubscribe from the newsletter, please email: [nativerice@cdu.edu.au](mailto:nativerice@cdu.edu.au)

### **A major project on Australian native rice commenced in 2020**

In April 2020 we commenced a substantial project investigating the agronomy of Australian native rice. This project aims to lay the foundations for commercialisation of Australian native rice as a high-value, low volume, culturally-identified, nutritious food. It is a high value product especially suited for tourism, gourmet food and restaurant markets, and for value-added products.

Our project team includes Charles Darwin University (Research Institute for Environment and Livelihoods) staff and students, staff from Queensland University of Technology (Centre for Agriculture and Bio-economies), researchers from Plant Industries in the NT Department of Industry, Tourism and Trade, and commercial partners Olive Vale Pty Ltd, Myera Group and Pudukul Aboriginal Cultural Tours.

The project is funded through the Future Food Systems Co-operative Research Centre and through cash and in-kind support from the NT Government, university and commercial partners.

The project will:

- Collect samples of wild grown populations of three species of Australian native rice, *Oryza meridionalis*, *O. rufipogon* and *O. australiensis*, from wetlands in the NT and Queensland, for cultivation trials,
- Investigate the agronomy of native rice using controlled trials to develop and validate optimum approaches to cultivate Australian native rice,
- Scale-up native rice cultivation trials with CRC partner Indigenous enterprises and communities in the NT and Queensland,
- Analyse and compare nutritional values of the Australian and Canadian wild rice species,
- Develop new milling techniques for native Australian rice, and
- Apply learnings from Canadian indigenous industry to commercialise Australian wild rice as a gourmet/health food and inputs to nutritional supplements.

You can read more about the project at:

<https://www.futurefoodsystems.com.au/commercialisation-of-native-rice-for-indigenous-enterprise-development-agronomy-and-value-adding/>

<https://www.cdu.edu.au/riel/research/australian-native-rice-commercialisation>

## Charles Darwin University native rice activities in 2020

At Charles Darwin University, Mrs Gehan Abdelghany started her PhD in March 2020, investigating the agronomy of Australian native rice. This PhD project has started with reviews and analyses of literature, as COVID delayed her arrival into Australia. Mrs Gehan Abdelghany, developed her research proposal and presented her PhD Confirmation of Candidature seminar on the 6 October 2020. She is currently writing up two literature reviews for publication, while she waits to arrive in Australia and start field trials.

An interview with Gehan Abdelghany is on the Future Food Systems CRC website:

<https://www.futurefoodsystems.com.au/gehan-abdelghany-from-nile-delta-crops-to-northern-australian-native-rice/>

With assistance from NT DITT and QUT researchers, we obtained seeds of three species of Australian native rice for planting and bulking up our supply of grain for experimental trials in the Northern Territory. We currently have the three main Australian species, *Oryza australiensis*, *Oryza meridionalis* and *Oryza rufipogon*, growing at Charles Darwin University.

During 2020, Charles Darwin University engineering students Mr Zhenyang Frederick Hou, Mr Yafei Gary He and Mr Felix Sunderland designed a thresher to remove the long needle-like awns from the northern floodplain species of native rice. Under the supervision of Stefania Klaric (Mechanical Engineering Researcher), Dr Penny Wurm (CRC FFS project researcher) and Dr Sean Bellairs (CRC FFS project researcher) they developed and produced several working prototypes that we will use for rice research trials. Other work by Masters of Engineering student Mr Chowdary Morusu investigated milling of native rice using our Satake rice mill.

Agronomic and supply chain investigations also commenced. Masters of Environmental Management student Mr Vamshi Lenkala investigated Aboriginal participation in supply chains for native Australian plant food products. An aim of the native rice project is to support Aboriginal enterprises and communities become involved in the supply and production of native rice products. Another Master of Environmental Management student, Ms Tanvi Patel, investigated the yield produced by *Oryza rufipogon* and *O. meridionalis* when grown in different soil volumes and with different fertiliser application rates. Meanwhile, project researcher Ms Sonam Rana investigated the effect of after-ripening on germination and the effect of different soil types on growth and survival.

You can read more about the CDU native rice project activities at

<https://www.cdu.edu.au/riel/research/australian-native-rice-commercialisation>

A NT Country Hour interview with Sean Bellairs discussing the project is at:

<https://www.abc.net.au/radio/programs/nt-country-hour/native-rice-trials-northern-territory/12871124>

If you have questions about the Charles Darwin University native rice activities, please email: [nativerice@cdu.edu.au](mailto:nativerice@cdu.edu.au)

## Northern Territory DITT (Plant Industries) native rice activities in 2020

Native rice is currently wild harvested in small quantities from crocodile infested environments using airboats. This harvest method cannot be implemented economically at scale. Thus, seed bulking is an important activity of the project.

We conducted bulking up of native rice seeds at the shade house in Coastal Plains Research Farm. The bulking up trial also investigated some growing parameters to develop a protocol for maximising seed production. Specifically, the superimposed treatments aimed to evaluate the effect of soil volume (4.5 L vs 9 L) and anaerobic/aerobic conditions on the growth of native *O. meridionalis* and *O. rufipogon* in soil from Beatrice Hill Farm (BH1 and BH2). We also included cultigen rice *O. sativa* for comparison with the native species and included potting mix to compare the growing media.

Generally, the growth of all *Oryza* species was better in BH2 floodplain soil when compared with BH1 floodplain soil, and native rice species did not grow well in potting mix. Soil analysis showed that BH2 soil had higher organic carbon and nutrients (nitrogen and trace elements) than BH1 soil. This result indicates that similar to cultigen rice, the growth of native rice is also affected by the fertility of the soil. Moreover, the growth of native was favourable in aerobic pots under aerobic conditions compared with that in pots under anaerobic conditions. We also found that a soil volume of 4.5L is enough for the growth of native rice. These results inform us for the 2021 bulking activity which will be done at Charles Darwin University.



**Figure 1. Native rice trials at Coastal Plains Research Farm, being undertaken by NT Department of Industry, Tourism and Trade Plant Industries researchers in collaboration with Charles Darwin University staff and students.**

## Queensland University of Technology native rice activities in 2020

In 2020, the QUT team identified two wild rice accessions that might be suitable for field trials at Olive Vale Pastoral's property. The first one is an accession of *Oryza meridionalis*. *Oryza meridionalis* is one of the four wild rice species found in Australia. It grows naturally in northern Australian floodplains where temperatures regularly exceed 35 °C in the monsoon growing season. Physical characteristics (size and shape) of Australian *O. meridionalis*, fall in the same range as that of domesticated cultigen rice suggesting this species has potential for commercialisation as a whole-grain food that could be consumed as an additional type of grain, but for similar uses as *O. sativa*. The second accession belongs to Australian native rice *Oryza australiensis*. *Oryza australiensis* is a perennial species that is distributed across northern Australia. It grows in seasonally wet locations and has a rhizome that allows the plants to survive through the dry season. This species has also been reported to harbour traits that are associated with biotic resistance to disease, such as resistance to bacterial blight. These two accessions have had good yields when grown in a glasshouse at QUT. Both *O. meridionalis* and *O. australiensis* are found growing annually at Olive Vale Pty Ltd property.

In addition, the QUT team has successfully optimised the protocols for nutritional profile analysis of wild rice grain, including protocols for: protein content, elemental profile (macro/micronutrients), dietary fibre, resistant starch, total fat, and vitamins using the up-to-date analytical platform at QUT. These protocols will be used for nutritional profile analysis of Australian native rice harvesting from trials in Northern Territory and Canadian native rice.

This month's articles written by Dr Sean Bellairs (CDU), Dr Tony Asis (DITT) and Dr My Linh Hoang (QUT). Photos by Melina McDowell (native rice growing naturally at Fogg Dam) and Sean Bellairs (rice grains and Figure 1).

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