

Indigenous Food Research Park

Native grains update – July 2022

Here is the second newsletter for 2022! There is so much news to share we cannot wait for you to read on.

Welcome, welcome, welcome!

Welcome to the newest member of the team! Dianne Yulawirri Hall is an artist who is passionate about the role of grains in the diets of Aboriginal people and on Country. Di has joined the AgriFutures Threshing Project for 2 days a week in Narrabri. One of her previous exhibitions was featured here:

<https://www.artlink.com.au/articles/4804/dianne-yulawirri-hall-white-food/>

Yaamanda Di!

From Gamilaraay and Yuwaalaraay country

We have started measuring the yield of our seed production area on Llara. Results for *guli* (Native Millet) suggests yields of 136 kg ha⁻¹ for the 2021-2022 season. To improve our estimates, if anyone has thick stands of *guli* they would like harvested next summer, please let us know. The *ganalay* (Mitchell Grass) was not worth harvesting this season because it did not like the high rainfall. This phenomenon was also observed at the farm of project partner John in Bellata.

We have started burning trials of *guli* and *ganalay*. John burnt or slashed areas on his farm in winter and spring in 2021, and we did similar treatments on a small part of Llara farm in April 2022. Burning is a traditional management practice used for managing perennial native grasses but is not used for annual commercial crops. Incorporating the knowledge of how to do this in a modern context with respect to the cultural role it plays is a priority for the next few years.

We are trying to get a better understanding the carbon flux implications of managing fields by burning and whether land holders can earn carbon credits. Knowing how soil carbon changes when a field is converted to native grain production, and how it changes with different management practices (e.g., burning, slashing, grazing) is important for determining the economic viability of the system, the interaction with cultural practice, and environmental sustainability of rural areas. There has been an assumption that carbon credits can be earned on native grains fields, but both scientific and legal questions still need to be investigated.

Kerrie Saunders and Amy Way have almost completed a cultural heritage assessment of the native plants at Llara farm. The locations, names, and uses of over 50 significant places and plants, including beds of darling lily, medicinal trees, salad greens and grain-bearing plants, have been mapped. With the changing of the seasons, knowing the locations of important plants will allow us to see the mosaic of the landscape and how ancient and modern food producing systems can work on the same area of land. This map will be consolidated over the next few years in collaboration with Heritage NSW, the local Aboriginal community, students, Central Operations Services (COS), and others to include other sites of cultural heritage significance. The project is led by the School of Philosophical and Historical Inquiry from The University of Sydney.



Cool burning of trial areas of Native Millet and Mitchell Grass in April 2022. This will be used for quantifying carbon and mineral exchanges, ecosystem recovery following different treatments, and to determine which treatment produces the most seed after recovery. The image in the bottom right was taken in July 2022 and shows general plant regrowth on the plots after 3 months.

Events and happenings

In February we hosted the team from Black Duck Foods and many visitors from across Queensland, New South Wales, and Victoria for three days of paddock-to-plate workshops. *Day 1* featured presentations and discussions, including the Agrifuture Industry Roadmap to be released later this year. *Day 2* was all about harvesting and threshing in the field. ABC did a great story highlighting our activity:

<https://www.abc.net.au/news/2022-02-13/narrabri-plant-breeding-institute-native-grains-harvest/100819478>

That evening we held a Johnny cake cook up by the Namoi River with the local Indigenous community and supported by NDCAS (plenty of pics on the NDCAS Facebook).

Day 3 involved in-field discussion of the advantages and disadvantages of harvesting from travelling stock routes (TSRs). This was followed by a visit to Fairview farm in Bellata (thanks John and Janey!) to see remnant plains of Mitchell Grass, native shrub rehabilitation, and to discuss advantages and disadvantages of harvesting under private partnerships. If you want to hear more, there are podcasts available from the MAAS Museum Culinary Archive and the WWF. Thanks to everyone who attended and the dozens of people who contributed – there are just too many to name!



Threshing, discussions and sharing food during the 3-day Paddock-to-plate workshop.

National Reconciliation Week in May in Narrabri was possibly an Australian first – the whole public event was catered by a professional catering company featuring food using native grain flour. In a partnership between Narrabri Council, The University of Sydney, Agrifutures, and the Narrabri and District Community Aid Service, the event involved a demonstration of native grain processing plus discussion on where it might fit into our landscapes. This was followed up with delicious shortbread and muffins using F5 *bungun* and *ganalay* flours, respectively. Approximately 80 people, of all ages and cultural backgrounds attended, and we were honoured to take part.

For us, NAIDOC week was all about families. Following the theme of “*Get Up! Stand Up! Show Up!*”, we cooked native grain pizza at the local Youth Centre, did some threshing and saltbush taste testing at Community Kids Daycare, and cooked native grain pancakes on the barbeque at the Wee Waa LALC Family Fun Day. It was a busy week, but so much fun. Despite all the science and research that we represent, the most important thing is family and community and seeing the impact of native grains as they make their way back onto Country and into diets.



Recognising National Reconciliation Week and NAIDOC with native grain shortbread and muffins, and pancakes.

Threshing

Have you ever wondered about the size and hairiness of native grass seeds and how they are made into food? During the first half of 2022, we continued to develop species-specific threshing methods for native grains for the Agrifutures Threshing Project. Anyone who has worked with native grains knows that separating the seed from the husk is the most expensive and time-consuming part of obtaining edible food, and this project is aimed at finding the best methods (economically, practically, culturally) of turning seeds into food grade grains. This image below shows the size of several species of native grain relative to its husk which illustrates why understanding threshing is so important. An ancient ancestor of modern wheat is in the bottom left corner for reference. A project report and videos are due early in 2023.



Left: what the husk? Size of seed of native grain species compared to the grass flowers in which they form (chaff). Right top and bottom: Seed samples of Warrego Grass and Weeping Grass for comparing different sizes, shapes, and colours of seed.

Diversity in grains and flour

Different ingredients are used for different reasons. The diversity of colour of the native grain flours alludes to their myriad uses. Just like oats are used in a different way to wheat, which is used in a different way to corn, and which is different to rice, the different species of native grain have different roles in modern food products. We are working with industry and community to identify these uses. Thanks to these suppliers and other industry partners, the respect for your work towards a vision of an Indigenous-led native grains industry is apparent.



Left: In this image, the flour displayed on the left is F5 *ganalay* (Mitchell Grass) mixed with organic stoneground wheat flour donated by Woodstock Flour. On the right is F5 *guli* (Native Millet) in single-origin high protein bread flour donated by Provenance Flour and Malt. Middle: Striking differences in colour of unmixed flour from native grasses. Right: F5 flour in use – the best display of all!

Quick fire updates

- We had the chance to chat to the (then) Minister for Agriculture, David Littleproud, and local member Mark Coulton on their visit to the PBI.
- We ran a workshop with the Clontarf Academy boys at PBI from year 11 and 12.
- Katie Moore and Kerrie Saunders ran a workshop for over 100 high schoolers with The University of Sydney Policy Lab in Moree. NITV produced this clip: fb.watch/ccxto34LGg/
- Kerrie was featured on 'Taste of Australia with Hayden Quinn' Season 5 Episode 4 (catch it on 10Play).
- Big thanks are due to Rebecca Thistlethwaite and Nicola Onus for working with Kerrie testing threshing methods from July to December 2021 while Angela was on leave. They will be co-authoring the final report for the AgriFutures Threshing Project.
- We are hiring a technician for our Narrabri site. The position will include field work, shed work and liaising with the Indigenous community for our human nutrition project with native grains. Closing date for applications: Sunday 31 July 2022. The link is: [Research Assistant Job in Tamworth & North West NSW - SEEK](#)



People and places. Left: Kerrie with David Littleproud and Mark Coulton (Picture credit: Guy Roth). Middle: Phil Stephens in workshop mode. Right: Rebecca Thistlethwaite in control of the many grosgrain samples.

Conferences and presentations

In July, Rebecca Cross presented at the Institute of Australian Geographers Conference held in Armidale. The abstract of this work is presented below. Prior to this meeting, Rebecca hosted a tour for a group of geographers who were attending the conference. They visited Llara farm and saw the recently burnt field trials of native grains and the recovery of mature plants and seedlings. On offer were delicious Arm Grass and *guli* pikelets cooked by Angela. We were willing guinea pigs for her latest creation.



Geographers, botanists, native grass, and pikelets – a great introduction to what our project and the IGFG team has to offer to others.

Regenerative rural transformations: an Indigenous-led native grasslands for grains industry

Rebecca Cross, Angela Pattison, Kerrie Saunders, Katie Moore, Tina Bell, Claudia Keitel, Ali Khoddami, Amy Way, Jakelin Troy, John Skinner, Rosanne Quinnell, Daniel Howell, Kim Bell-Anderson

Regenerative and sustainable transitions in agriculture have fast gained traction over the past decade and are arguably the cornerstone in enabling rural climate change adaptation and mitigation. However, emerging from a North American context there are increasing calls to recognise the limitations and tensions inherent in this movement, highlighting the need to decolonise and indigenise regenerative agriculture to induce transformational change (Regenerative Agriculture Alliance, 2020). This paper presents results from a 5year interdisciplinary pursuit to support and co-foster an Indigenous-led native grains industry on and with Gomeroi Country in North-Western NSW. This project aimed to embody a highly collaborative, place-based relational approach to research and as such, both our methodological insights as well as insights into the challenges and opportunities for developing this grass-roots industry are unpacked. This includes a “harvesting with” and “cooking with” research practice as extensions of and in addition to “walking with” methodology. Additionally, we present the agricultural, ecological, social, and cultural considerations and complexities for developing this industry that have emerged through collective workshops and dialogues. These findings ultimately point to the need for cooperative landscape-scale models for production of native grains designed and driven by local Aboriginal communities, entrepreneurs, and enterprises. Furthermore, we argue that developing long-term place-based authentic research partnerships to support and bolster Indigenous agricultural self-determination, and therefore regenerative *transformation*, is a priority.

Student research projects – the lifeblood of our team

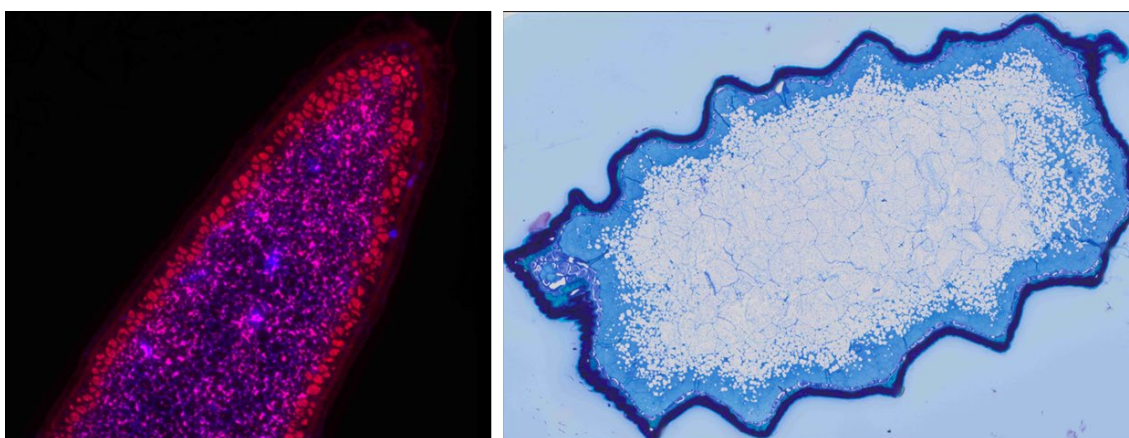
Claudia Keitel supervised an Honours project recently completed by Emma Watkins as part of her Bachelor of Science and Bachelor of Advanced Studies (Food and Agribusiness) degree.

Evaluation of the Quandong kernel

Emma Watkins

The current Quandong industry remains small and limited to the production of food and cosmetic products derived from only the fruits flesh, with the kernel discarded. The inclusion of the kernel into commercial production has great potential to provide economic gains from a currently wasted resource, but more importantly to expand an Indigenous Food Industry on both a domestic and international level. There is a deficiency in general research into quandong kernel's nutritional value, its oil composition, and its potential uses. This study explored the kernel's nutritional compositional and antimicrobial properties, as well as provide insight into viable oil extraction methods. Quandong seeds from two sources (Broken Hill and Narrabri) were assessed by various physical and physiochemical parameters. Narrabri kernels were smaller, had lower moisture, ash, and protein content. Quandong kernels had comparable nutrient values to other commonly consumed nuts and seeds such as protein content (14%) and ash content (i.e., mineral) content (1.9%), which are optimal for dietary intakes. The traditional method of oil extraction via an expeller press was compared to solvent extractions including the Folch method and a Buchi SpeedExtractor (E-916). The Folch method proved to be the most appropriate method, due to the presence of a gum which strongly bound the kernels matrix, preventing the oil extraction by other techniques. The fatty acid profile of both Quandong sources were dominated by oleic acid (48-51%) and Santalbic acid (25-42%). Anti-microbial activity of quandong oil was tested against *E. coli* on Petri dishes. Narrabri oil exhibited zones of inhibition, however, results were inconclusive of and need further testing. This study has established several key properties of quandong kernels and its oil, with potential for utilisation in pharmaceutical, cosmetic and food industries.

Tom Roberts, Ali Khoddami, and Claudia Keitel supervise a PhD student, Farkhondeh (Fran) Abedi who is investigating the morphology and biochemistry of four Australian native grain species. Fran uses fluorescence microscopy to visualise the internal structure of the grains. To do this, she embeds the grain in resin, and cuts thin sections with a microtome. The sections are then stained with acid fuchsin – calcofluor and methylene blue to identify the distribution of starch and protein in endosperm and aleurone layers and the different size and structure of cell walls and the seed coat.



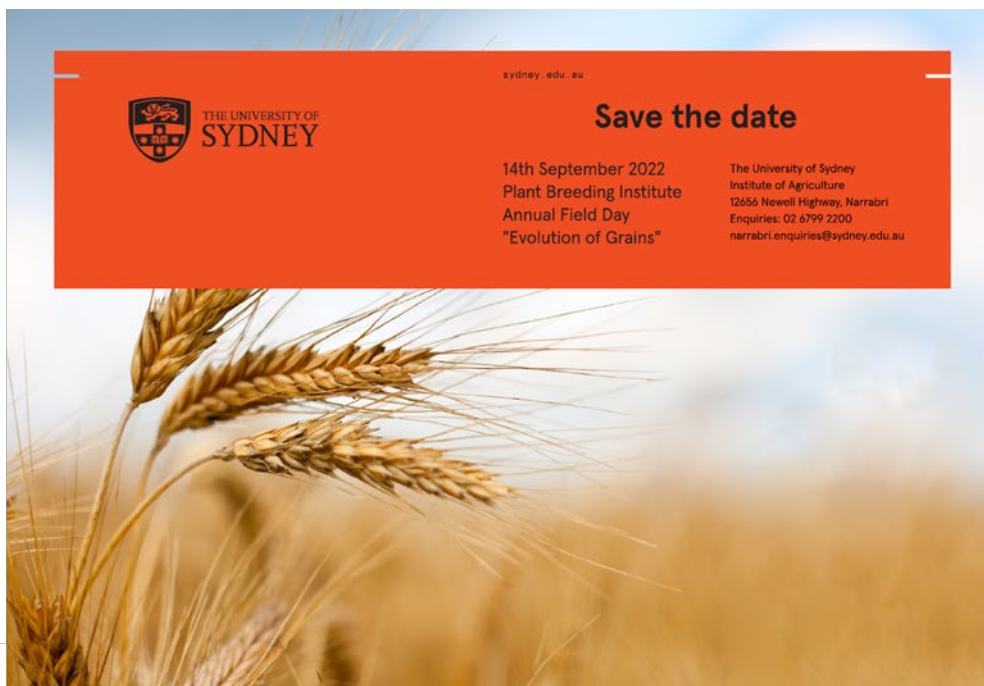
Left: Weeping Grass (*Microlaena stipoides*) stained with acid-fuchsin calcofluor; protein is stained red, cell walls rich in β -glucan are stained blue and starch appears black. The aleurone layer surrounding the endosperm appears red due to high protein content. Right: Button Grass (*Dactyloctenium radulans*) stained with methylene blue. The seedcoat and aleurone layer appear blue, and the endosperm rich in starch appears white.

Upcoming events

- PULSE of the Earth Festival, The Living Classroom, Bingara, 2-4 September. The festival is a celebration of regenerative agriculture, with shows, talks, art, stalls, and demonstrations. The Indigenous Grasses for Grain (IGFG) team have been invited to present and have a stall showcasing native grains
- Narrabri Field Day 14 September – the IGFG will be in full swing.
[Narrabri Plant Breeding Institute Field Day 2022 Tickets, Wed 14/09/2022 at 12:00 pm | Eventbrite](#)

Yalu!

The IFRP team



What to expect

- Complimentary BBQ lunch (sponsored by AGT)
- Field displays of wheat, chickpeas, faba beans and Indian mustard breeding programs
- Book launch - the first 60 years, the history of Australia's first grower initiated and owned wheat research institute, L. O'Brien
- Demonstrations of innovative weed control technologies
- The release of three new AGT canola varieties
- Digital Agricultural technologies
- New and historical wheat varieties
- Soil carbon - how it works
- Native grains and plant proteins





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