

Native Grains from paddock to plate

Teachers workshop



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Acknowledgement of Country

*We acknowledge the tradition of
custodianship and law of the Country on
which the University of Sydney campuses
stand. We pay our respects to those who
have cared and continue to care for Country.*



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Agenda

- **Sharing knowledges** to combine native grains with best-practice commercial agricultural systems
- How to navigate some of the difficult questions students might ask (or really want to ask!)
- Where to find teaching resources on native grains



= An idea you could try with students

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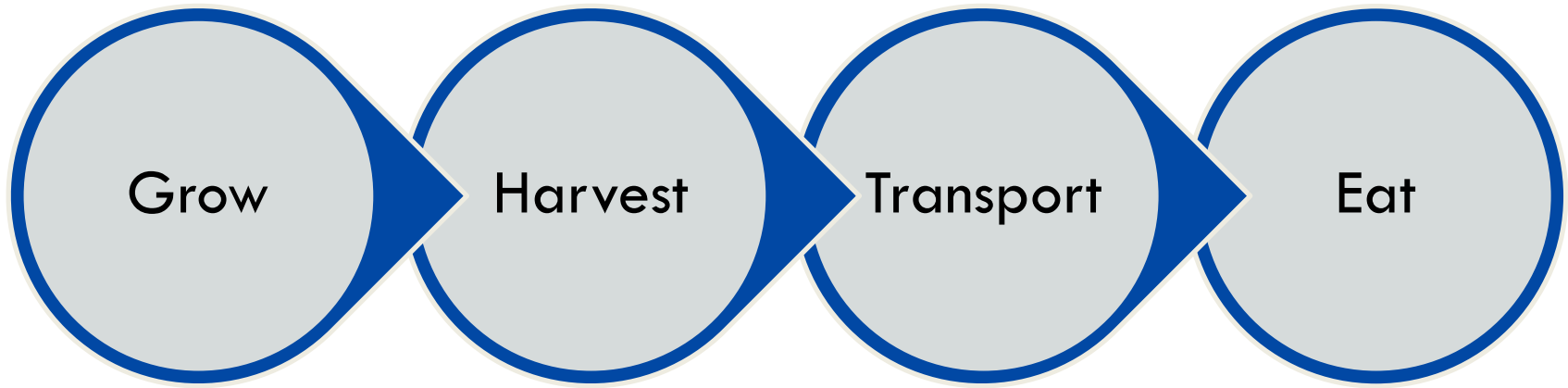


How can we share ancient and modern grains knowledges?

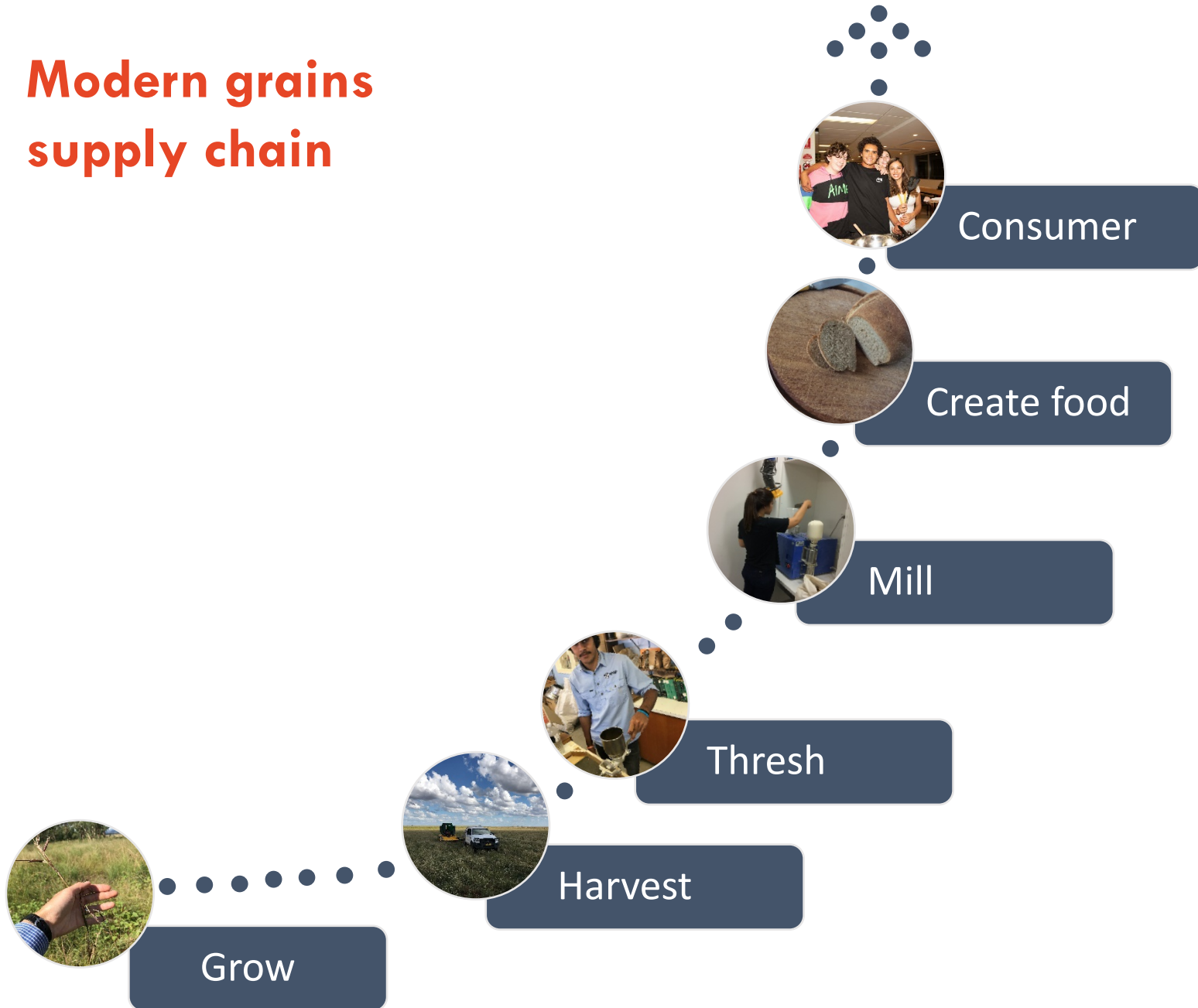
We have to recreate the entire system from the field, to processing, to people, and how they interact back to the field



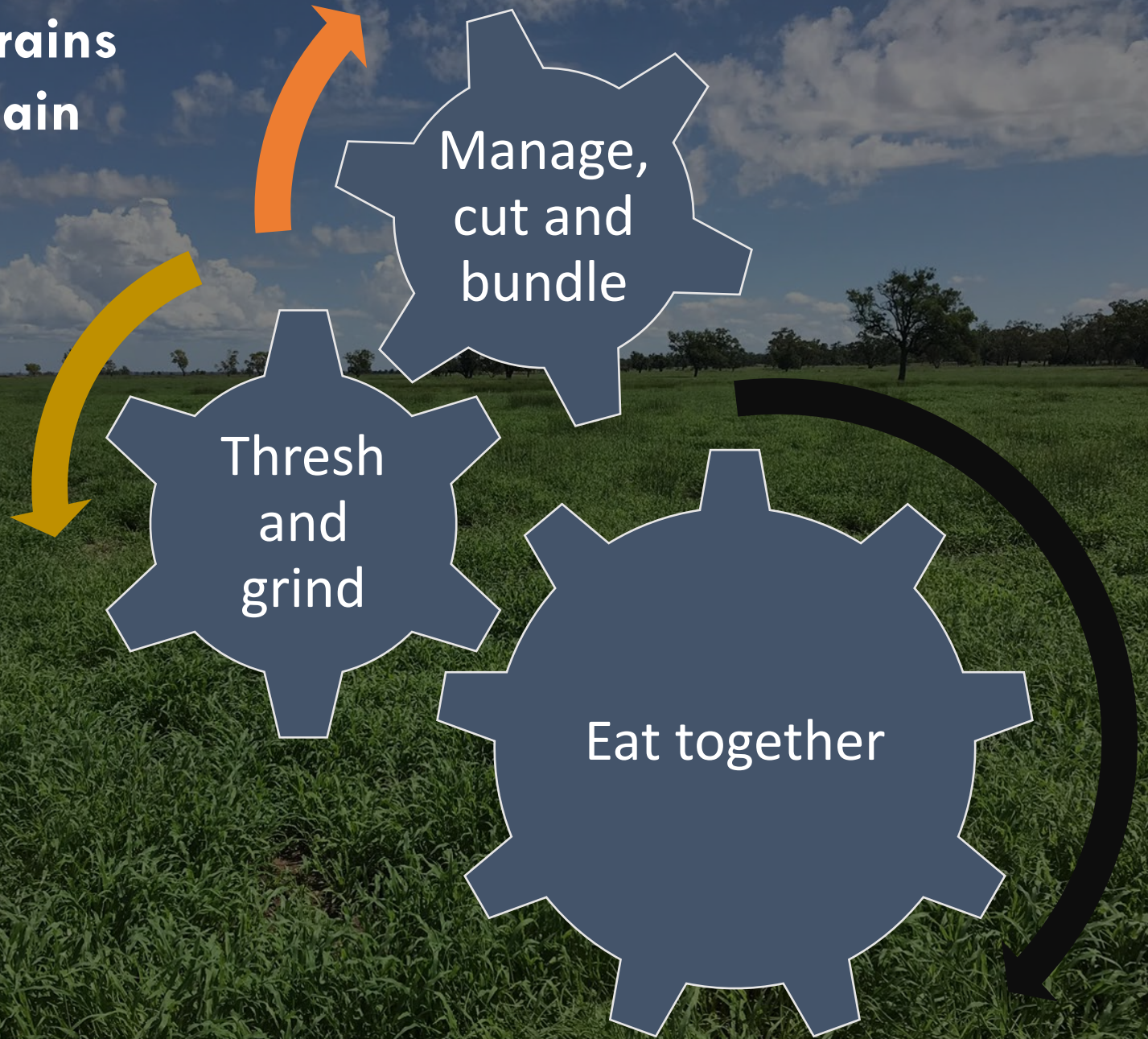
Modern fruit supply chain



Modern grains supply chain



Historic grains supply chain



Implications for combining knowledge



Draw the paddock-to-plate production chains

– Can we use water in threshing?

Food spoils over time

– Can we sell food that's different each harvest?

Food needs to be safe and somewhat predictable

Growing native grain crops



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Species from Gomeroi country



Native grass species:

- *Astrebla* spp. (Mitchell Grass)
- *Dicanthium sericium* (QLD Bluegrass)
- *Themeda australis* (Kangaroo Grass)
- *Bracharia milliformis* (Arm Grass)
- *Dactyloctenium radulans* (Button Grass)
- *Anthosachne scabra* (Wheat Grass)
- *Panicum decompositum* (Native Millet)
- *Paspalidium jubiflorum/distans* (Warrego Grass)
- *Themeda avenacea* (Tall oat grass)
- **Microlaena stipoides* (Weeping grass)

Other grassland grains:

- *Lomandra longifolia* (Spiny Headed Mat Rush)
- *Portulaca oleracea* (Puslane)
- *Acacia* spp.
- *Santalum acuminatum* (Quandong)
- *Atriplex nummularia* (Old Man Saltbush)
- *Brachychiton populneus* (Kurrajong)

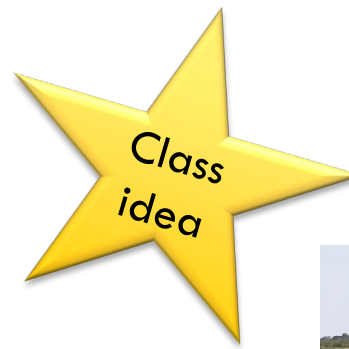
Mitchell grass ecosystem, May 2017



Mitchell grass ecosystem, May 2020



One or many species?



- Agronomic considerations
 - Weed control
 - Plant competition
 - Harvest timing
 - Harvest difficulty
 - Post-harvest grain separation



Fire vs grazing?

- How to incorporate regenerative agriculture principles:
 - Change in species mix, fauna
 - Carbon credit implications?
 - Livestock provides additional income
 - Livestock requires additional skills + resources

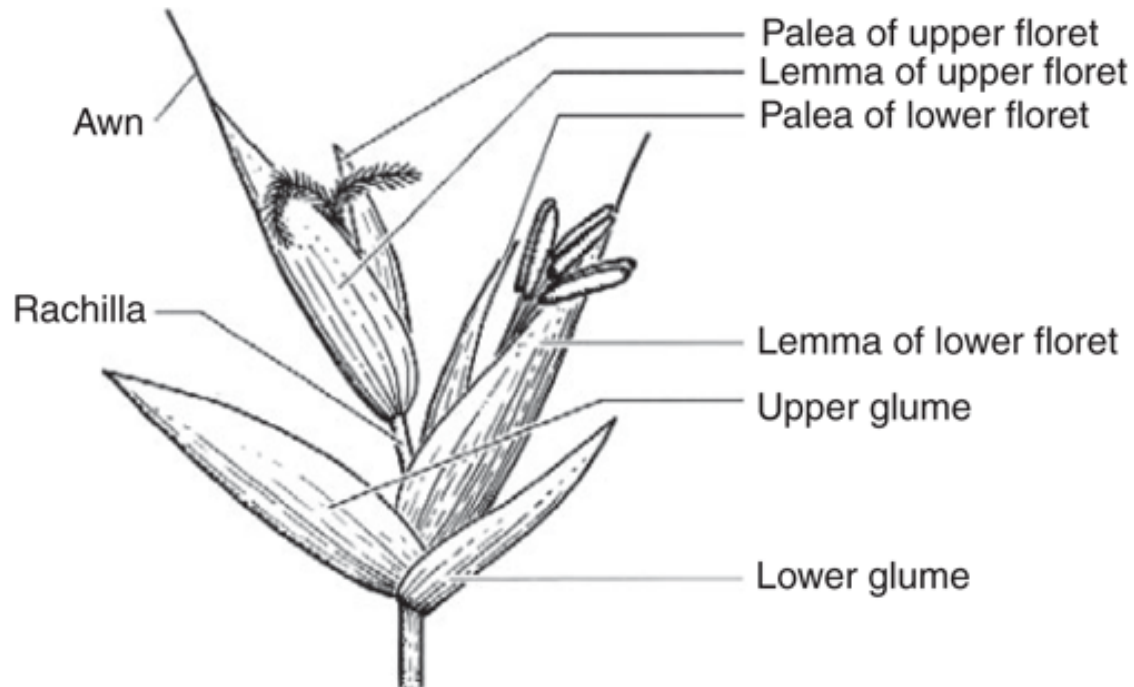


Post-harvest processing



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Threshing and grass seed morphology



Taken from: Cavanagh Annette M., Godfree Robert C., Morgan John W. (2019) An awn typology for Australian native grasses (Poaceae). *Australian Journal of Botany* **67**, 309-334.

Steps to handthresh native grass



Step 1- Get a wood threshing board. Put about a handful of grain. Spread it out, make sure there is no sticks or cathead or other junk that could give you a pinch.



Step 2- Find a flat piece of wood or a float.

Put a piece of rubber under the float; tape the rubber to the float.

Move the float back and forwards with some force for about 3 to 4 mins

Sometimes this method doesn't work with some grains



Step 3 –Put all the grain in the corner of the box then put the sieve on top of a bucket to catch the seed.

Lift the box, pour it onto the sieve then shake the sieve back and forwards for about a min or two then hopefully you have seed.

If not repeat step 1 and 2 again.



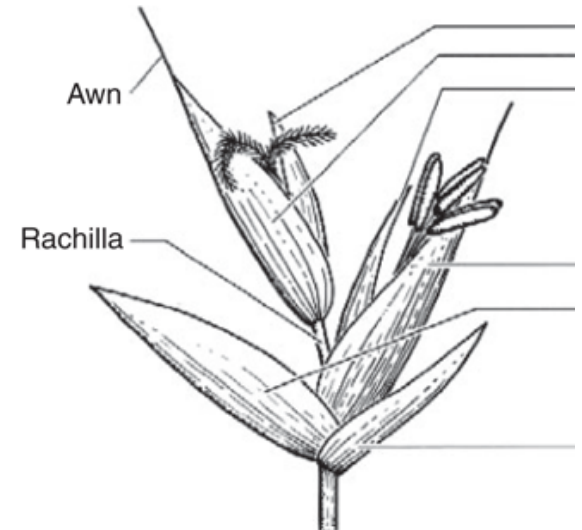
Step 4 - final step

Once sieving is finished put the grain that is in bucket in the pestle.

Pick out the big pieces of trash then gently blow.

All should be left in the pestle is seed.

Threshing and grass seed morphology



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What machines can separate grain?

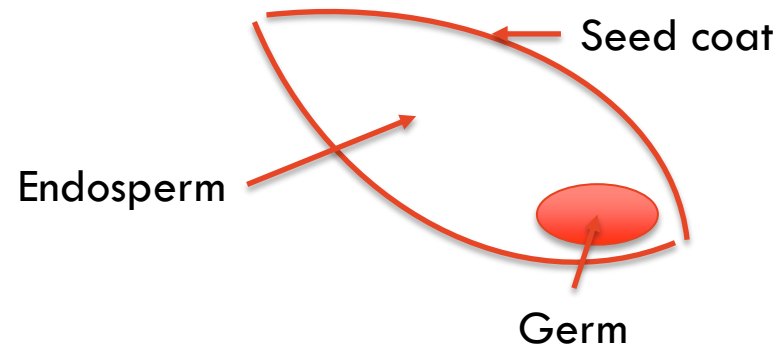


Nutritional testing



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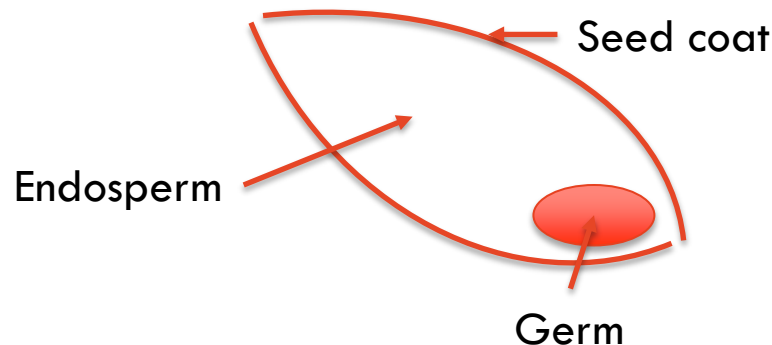
Seed anatomy



Processing to flour

Grinding = creating wholemeal flour using all parts together

Milling = creating white flour by separating coat/germ from endosperm

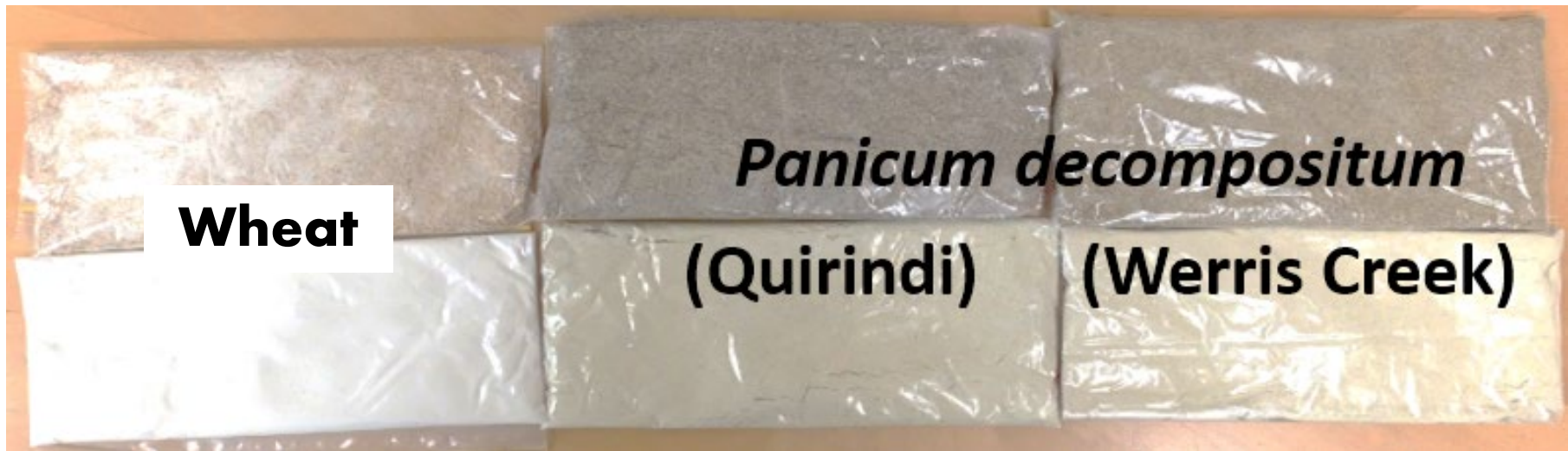


Ground (wholemeal) flour



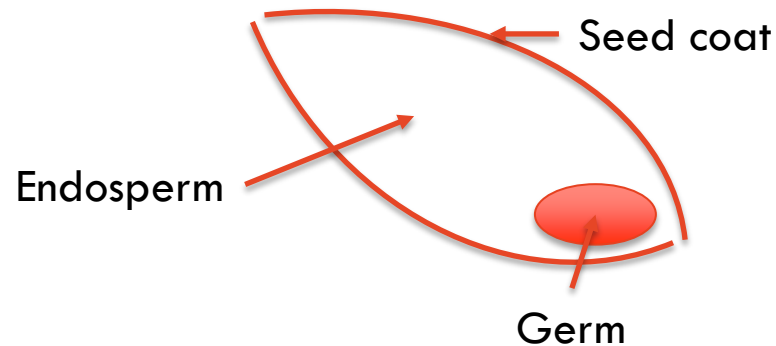
Kangaroo grass (*Themeda triandra*)

Milled (white) flour



Nutrition in the coat and germ

- Whole grains are healthier than refined flour
- [Refined flour has dough, texture and shelflife benefits]



How nutritious is whole vs refined flour?

How nutritious are native grains?



NUTRITION INFORMATION	
SERVING PER PACKAGE: 2	SERVING SIZE: 340g
AVERAGE QUANTITY PER SERVING	AVERAGE QUANTITY PER 100g
ENERGY	
PROTEIN	
FAT, TOTAL	
- SATURATED	
CARBOHYDRATE	
- SUGARS	
SODIUM	

Ingredients: Mitchell grass flour



Native millet

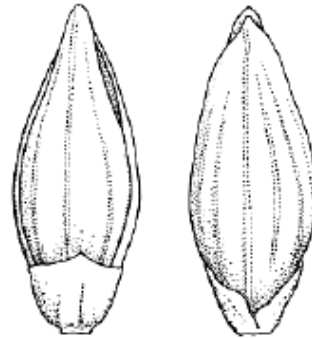


Image credit: PlantNET



<https://vicflora.rbg.vic.gov.au/>



Panicum decompositum

Compound	Amount (per 100 g)
Carbohydrate	63 g
Protein	12.9 – 14.1 g
Fat	5.6 g
Saturated	1.1 g
Unsaturated	4.5 g
Ash	7.1 g
Energy	1678 kJ

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Kangaroo grass



Image credit: PlantNET



<https://www.gardenexpress.com.au/>



Themeda australis

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Compound	Amount (per 100 g)
Carbohydrate	52 g
Protein	17.6 – 19.3 g
Fat	8.9 g
Saturated	1 g
Unsaturated	7.9 g
Ash	9.6 g
Energy	1819 kJ

Cultural and environmental context



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Opportunities in commercialising native grasses

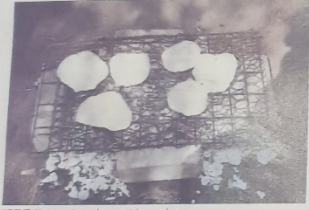
Researchers and members of the Aboriginal community gathered at Tullahoma Reserve at Wee Waa recently to explore a new future for native grasses and grains. Traditional foods of indigenous communities for thousands of years. A feature of the day was the cooking of johnny cakes, made from native grains, and some brown wheat flour.

University of Sydney Plant Breeding Institute researcher at Narrabri, Angela Pattison, has been working on a project to study pre-colonial indigenous agriculture and the development and application of native grasses and grains. Dr Pattison said she had been inspired by Bruce Pascoe's book, *Dark Emu*, to explore the pre-colonial agriculture of Australia's First Peoples and is working with the local community to better understand Aboriginal agricultural techniques.

Dr Pattison, in conjunction with the Wee Waa Local Aboriginal Land Council, organised the get-together of members of the Aboriginal community, including several experts on the use of native grains for food, with participants from the University of Sydney, Murray TAFE, Murray Darling Basin Authority and Narrabri Shire Council.



RIGHT: Wee Waa Lands Council CEO Robyn Keefe, Glenda Mason, Robyn Green, Teresa Wenner, Samantha Hamilton, Violet Dewson and Cheryl Gordon cook johnny cakes over the coals.



ABOVE: Native grains make great johnny cakes.



RIGHT: Wee Waa Lands Council caterers for the Tullahoma event on Thursday, Cheryl Gordon, Glenda Mason, CEO Robyn Keefe, Samantha Hamilton, Vida Dawson, Robyn Green and Teresa Wenner -Combo.



Visitors Draghtas Diaz, Abraham Njanes, TAFE Morse, and Prof. Jaime Gongora, Sydney University.



Helen Wenner, Dr Angela Pattison and University of Sydney visitor Joanna Haddock.



Helen Wenner, Dr Angela Pattison, with University of Sydney visitors Prof. Jaime Gongora, Tina Bell, Caroline Marin and Rebecca Halliday.

Native grains is bo

Johnnycakes, grains, and so were on the m at Tullahoma Thursday. Johnnycakes describe baked grains. University of Institute in Angela Pattison on a project indigenous development grasses and Dr Pattison inspired by Bruce Emu, to agriculture o and is working with the local community to better understand Aboriginal agricultural techniques.

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Wee Waa Lands Council CEO Robyn Keefe, Glenda Mason, Robyn Green, Teresa Wenner, Samantha Hamilton, Violet Dewson and Cheryl Gordon cook johnnycakes over the coals.

Cooking up native grains and grasses

Johnnycakes made from native grains, and some from wheat flour, were on the menu at a special event at Tullahoma Reserve near Wee Waa on Thursday.

Johnnycake is a colloquial term to describe baked breads using native grains.

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Dr Pattison, in conjunction with the Wee Waa Local Aboriginal Land Council, organised a get-together of members of the Aboriginal community, including several experts on the use of native grains for food, with participants from the University of Sydney, Murray TAFE, Murray Darling Basin Authority and Narrabri Shire Council to learn about native grasses and grains and sample johnnycakes made from the grains.

The johnnycakes were cooked over coals and enjoyed by everybody. The native grasses used to make the



Mayor Cathy Redding samples a quandong with from left, Samantha Hamilton, Wee Waa Land Council CEO Robyn Keefe, Helen Wenner, Narrabri Land Council CEO Lyn Trindal and Violet Dewson.

johnnycakes.

Dr Pattison said that there are tracts of land under management by the Lands Councils which could be used for traditional forms of agriculture, if we knew how to do it.

The possibility of commercialisation is a focus of the project.

Some grains produce very nutritious grain in large quantities, including oilseeds with a very high omega 3 fatty acid content.

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Co-teaching



- Inter-discipline teaching
- Aboriginal teacher or liaison officer (or an appropriate local Aboriginal community member) share on cultural values
- Ag or science class grows, threshes or grinds the grains
- Food tech class cooks the flour

Resources and short videos



<https://www.sydney.edu.au/science/our-research/research-areas/life-and-environmental-sciences/indigenous-grasslands-grain.html>

Scroll down to 'Resources for industry and education'